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Automobile Insurance Losses
Personal Injury Protection and Collision Coverages

THE EFFECTS OF CAR SIZE ON CRASH LOSSES 1977-1980 MODELS

Research Report HLDI A-13
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Summary

This Highway Loss Data Institute (HLDI) report presents relationships between car size and body style and insurance losses. Results are presented for Personal Injury Protection coverages for 1977-1979 model year passenger cars and for Collision coverages involving 1978-1980 model year cars.

Principal Findings:

Personal Injury Protection

- The frequencies of injury claims with medical payments exceeding various dollar thresholds were strongly influenced by car size; the smallest cars had the worst injury loss experience.

- Sports and specialty models had consistently higher frequencies of injury claims than two-door and four-door models of the same size.

Collision

- Small subcompact and subcompact models had above average collision losses, as did full-size luxury cars. Compact and intermediate models had lower than average results.

- Sports and specialty models had the highest collision losses in all car size groups. Two-door models consistently had higher losses than four-door models of the same size.

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Introduction

The Highway Loss Data Institute (HLDI) is a non-profit, public service organization that gathers, processes, and publishes insurance data concerned with human and economic losses associated with motor vehicle use, and especially with the ways such losses vary among different kinds of vehicles.

Since 1977, HLDI reports have classified individual passenger cars into four size groups – subcompact, compact, intermediate, and full size – defined by their wheelbases. Within each size group the cars were additionally classified by body style – regular two-door models, regular four-door models, station wagons, and sports or specialty models (see Appendix A for definitions). The purpose of this classification was two-fold: first, since it has been repeatedly documented that the chance of death or injury to vehicle occupants is strongly related to the size of the car, the HLDI classification provides a basic separation of cars into different injury risk categories; and second, defining groups of cars with similar sizes and body styles facilitates comparisons of the loss experience of cars with similar characteristics that are likely to be competing with each other in the market place.

In the last few model years there has been a dramatic shift in numbers of small cars being sold. For example, as recently as the 1977 model year, intermediate and full size cars accounted for 69 percent of the overall Collision coverage exposure (58 percent for intermediates, and 11 percent for full size cars), and subcompacts and compacts accounted for 31 percent (13 percent and 18 percent, respectively). By the 1980 model year, this mix had changed to 13 percent for the larger cars, with full size cars, which are all luxury models, accounting for only 1 percent, and 87 percent (50 percent subcompacts and 37 percent compact) for the smaller cars.

For the 1977 model year, 42 of the 108 individual makes and series for which results were published by HLDI were small cars (23 subcompact and 19 compact). By the 1980 model year, this had increased to 85 of the 116 individual makes and series that were reported, and there were only three full size series with sufficient exposure to report.

It seems virtually certain that this trend will continue; the manufacturers' plans call for a continuing emphasis on small cars and a phasing out of the larger cars. In view of this, HLDI starting with this report has begun subdividing each of its two small car groups into two distinct size groups. Thus subcompacts will be classified – on the basis of their wheelbases – as either small subcompacts (wheelbase less than or equal to 96 inches) or subcompacts (wheelbase greater than 96 inches but less than or equal to 101 inches). Compacts, similarly will be divided into small compacts (wheelbase greater than 101 inches but less than or equal to 106 inches) and compacts (wheelbase greater than 106 inches but less than or equal to 111 inches). The other two size groups – intermediate and full- size – will remain unchanged, although it should be recognized that the full- size group has already virtually dissappeared.

The purpose of this report is to present previously published HLDI results for 1977 through 1980 models *using the new size groups*. These results correspond to those previously published in HLDI research reports I79-1 and R80-2 using the four previous wheelbase divisions.

It is intended that the dissemination of this and other HLDI reports will contribute to research into ways for reducing highway damage to people and their property, and also provide the public with information relating to the differences in the crash damage produced by different kinds of vehicles.

Results and Discussion

Injury Coverages

This report presents four separate injury claim frequency results for passenger cars from model years 1977 to 1979. These are the frequency of all claims, both pending and paid, and the frequency of claims with medical payments exceeding $250, $500, and $1,000, respectively. These last three sets of results allow comparisons of the frequency of claims of increasing severities.

Each claim frequency result is presented in relative terms, with 100 representing the result for all cars in *each* claim size category. Thus, comparisons should be made either within a claim size category or by considering sets of claim frequency results. It is important to keep in mind that the *relative* claim frequency results for the different claim size amounts are not directly comparable because each set of relative results is based on a different value of 100.

The actual frequencies of claims decrease rapidly with increasing claim size. The frequency of claims exceeding $250 was approximately one-third the overall frequency, the frequency exceeding $500 was about one-fourth the overall frequency, and the frequency exceeding $1,000 was less than one-sixth the overall frequency. On the other hand, the total dollars paid out were dramatically influenced by the more expensive claims. Claims exceeding $500, although only one-fourth of all claims, accounted for over 85 percent of the total dollars paid out, and claims exceeding $1,000, although less than one-sixth of all claims, accounted for three-quarters of the dollars paid out.

Table 1 summarizes the injury loss experience of the 1977 through 1979 model year passenger cars by size group and body style subgroup. The exposure thresholds for reporting results were 5,000 insured vehicle years for the "All" results, 10,000 years for the greater than $250 results, 15,000 years for the greater than $500 results, and 25,000 years for the greater than $1,000 results. In cases where the exposure threshold was not achieved, no result is shown.

Figure 1 shows the injury loss experience for the six size groups. From this figure it is apparent that the smallest cars had the worst injury loss experience in all claim size categories and there was a strong inverse relationship between car size and the injury loss experience. From the small subcompacts up to and including the intermediate-sized cars, the injury loss experience improved with increasing car size. Full-sized cars had the lowest overall claim frequency but the results for the larger claim sizes were higher than corresponding results for intermediate-sized cars.

Figure 2 shows the injury loss experience for the regular two-door models. Again it is apparent that the smallest two-door models had the worst injury loss experience and that in general the injury loss experience improved as the car size increased. Figure 3 shows the injury loss experience for the regular four-door models, and it shows a pattern similar to that in Figure 2.

Figure 4 shows the injury loss experience for the sports and specialty models. Again, this shows that the smallest cars had the worst injury loss experience. In addition, when Figure 4 is compared with Figures 2 and 3, it is apparent that sports and specialty models had a consistently worse injury loss experience than regular two- and four-door models of the same size.

Collision Coverages

The HLDI reports which have summarized the Collision coverage loss experience of various groupings of individual models present results based on three categories of loss experience. Claim frequency results measure how often Collision claims are submitted for particular vehicles during a given period of time and

(Cont'd on page 9)

TABLE 1
PERSONAL INJURY PROTECTION COVERAGES
RELATIVE INJURY CLAIM FREQUENCIES BY SIZE OF CLAIM
1977-1979 MODELS

Size* and Body Style	Exposure	Relative Claim Frequencies by Size of Claim			
		All	> $250	> $500	> $1,000
ALL (Claims per 1,000 insured vehicle years)	5,674,895	100 (=18.2)	100 (=6.8)	100 (=4.5)	100 (=2.7)
Small Subcompact	**882,947**	**127**	**125**	**122**	**120**
Regular two-door	721,777	129	126	123	120
Regular four-door	16,376	121	130	122	
Station wagon	94,039	112	109	104	106
Sports	50,755	126	141	141	144
Subcompact	**635,471**	**116**	**113**	**111**	**108**
Regular two-door	416,202	121	116	113	108
Regular four-door	123,383	117	110	112	112
Station wagon	70,939	96	97	91	93
Sports	24,947	95	118	120	
Small Compact	**177,698**	**110**	**105**	**104**	**100**
Regular two-door	77,868	122	116	113	106
Regular four-door	50,804	106	103	107	116
Station wagon	43,732	94	87	83	73
Specialty	5,294	109			
Compact	**1,359,963**	**101**	**99**	**99**	**100**
Regular two-door	588,525	100	98	98	98
Regular four-door	333,845	94	92	90	92
Station wagon	74,619	85	77	79	74
Specialty	362,974	113	113	115	116
Intermediate	**2,151,859**	**85**	**87**	**87**	**89**
Regular two-door	575,082	87	90	91	94
Regular four-door	737,302	78	78	77	79
Station wagon	294,352	76	70	71	73
Specialty	544,624	97	103	104	104
Full-Size	**466,957**	**81**	**93**	**97**	**101**
Regular two-door	71,976	89	94	98	104
Regular four-door	137,426	79	87	86	92
Station wagon	39,185	76	76	81	79
Specialty	218,370	80	100	107	111

*** CAR SIZE DEFINITION**

Small Subcompact – Cars with wheelbases less than or equal to 96 inches.
Subcompact – Cars with wheelbases greater than 96 inches and less than or equal to 101 inches.
Small Compact – Cars with wheelbases greater than 101 inches and less than or equal to 106 inches.
Compact – Cars with wheelbases greater than 106 inches and less than or equal to 111 inches.
Intermediate – Cars with wheelbases greater than 111 inches and less than or equal to 120 inches.
Full-Size – Cars with wheelbases greater than 120 inches.

Figure 1

Personal Injury Protection Coverages
Relative Injury Claim Frequencies by Size of Claim
1977-1979 Models

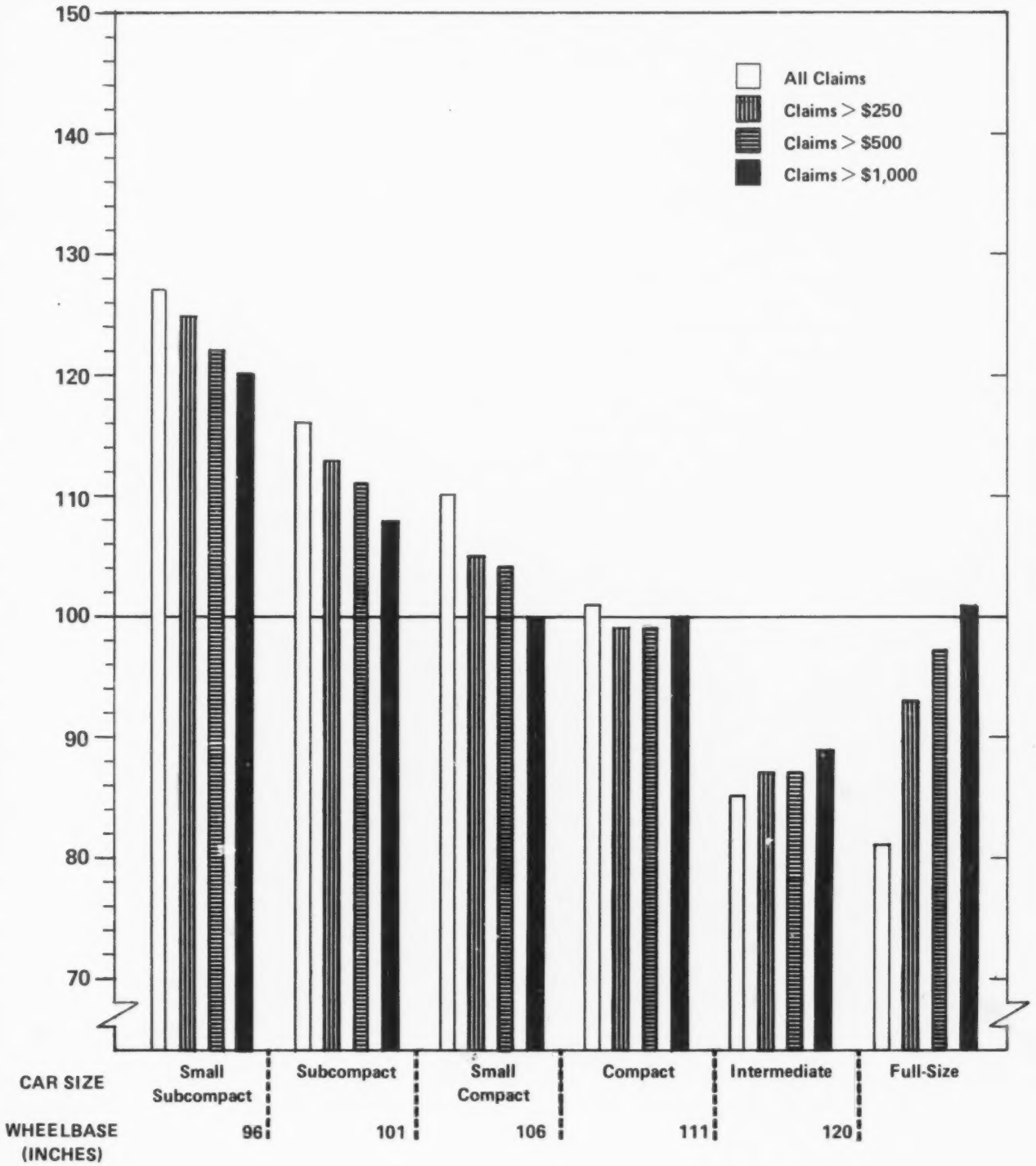


Figure 2

Personal Injury Protection Coverages
Relative Injury Claim Frequencies by Size of Claim
1977-1979 Regular Two-Door Models

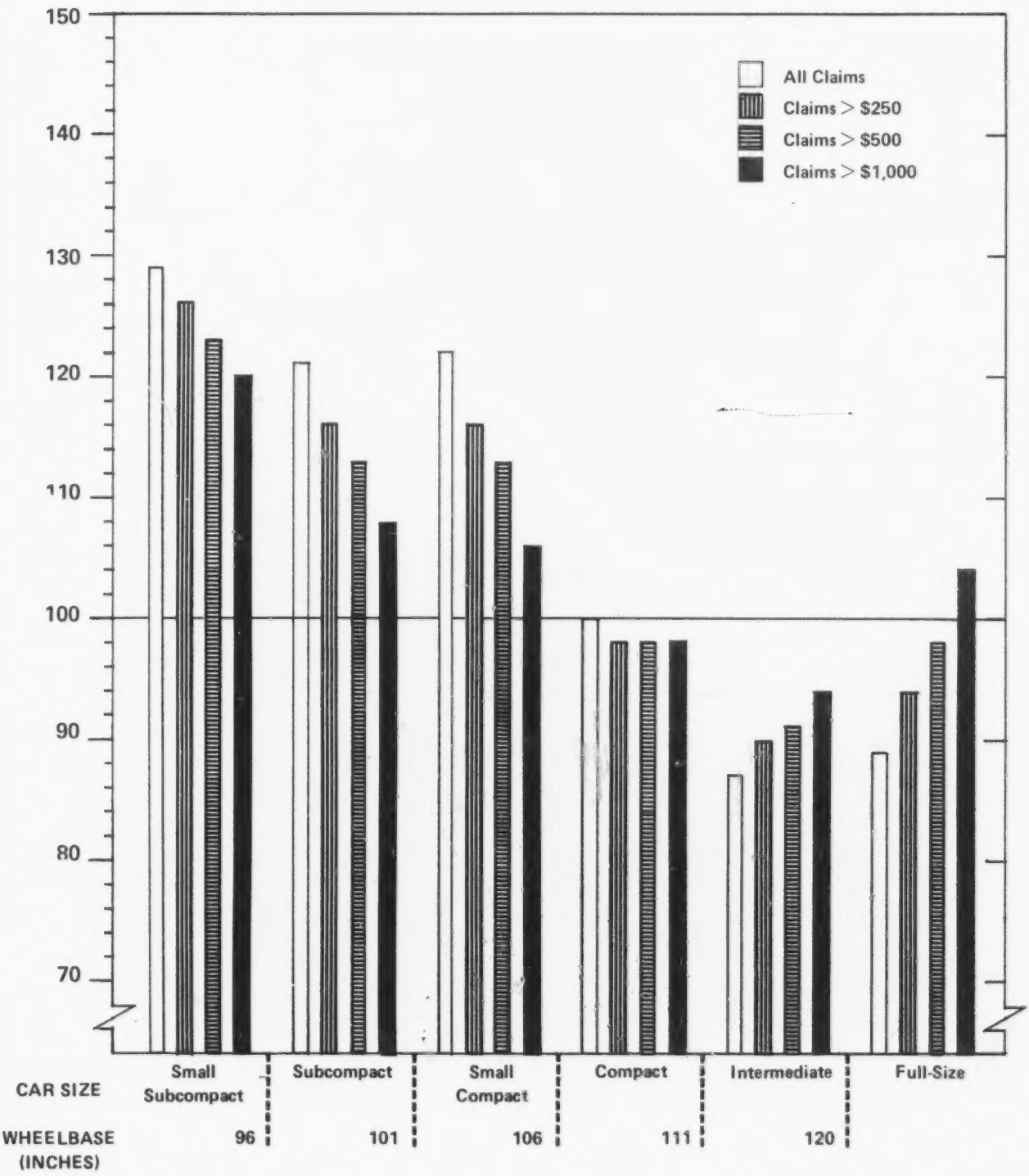


Figure 3

Personal Injury Protection Coverages
Relative Injury Claim Frequencies by Size of Claim
1977-1979 Regular Four-Door Models

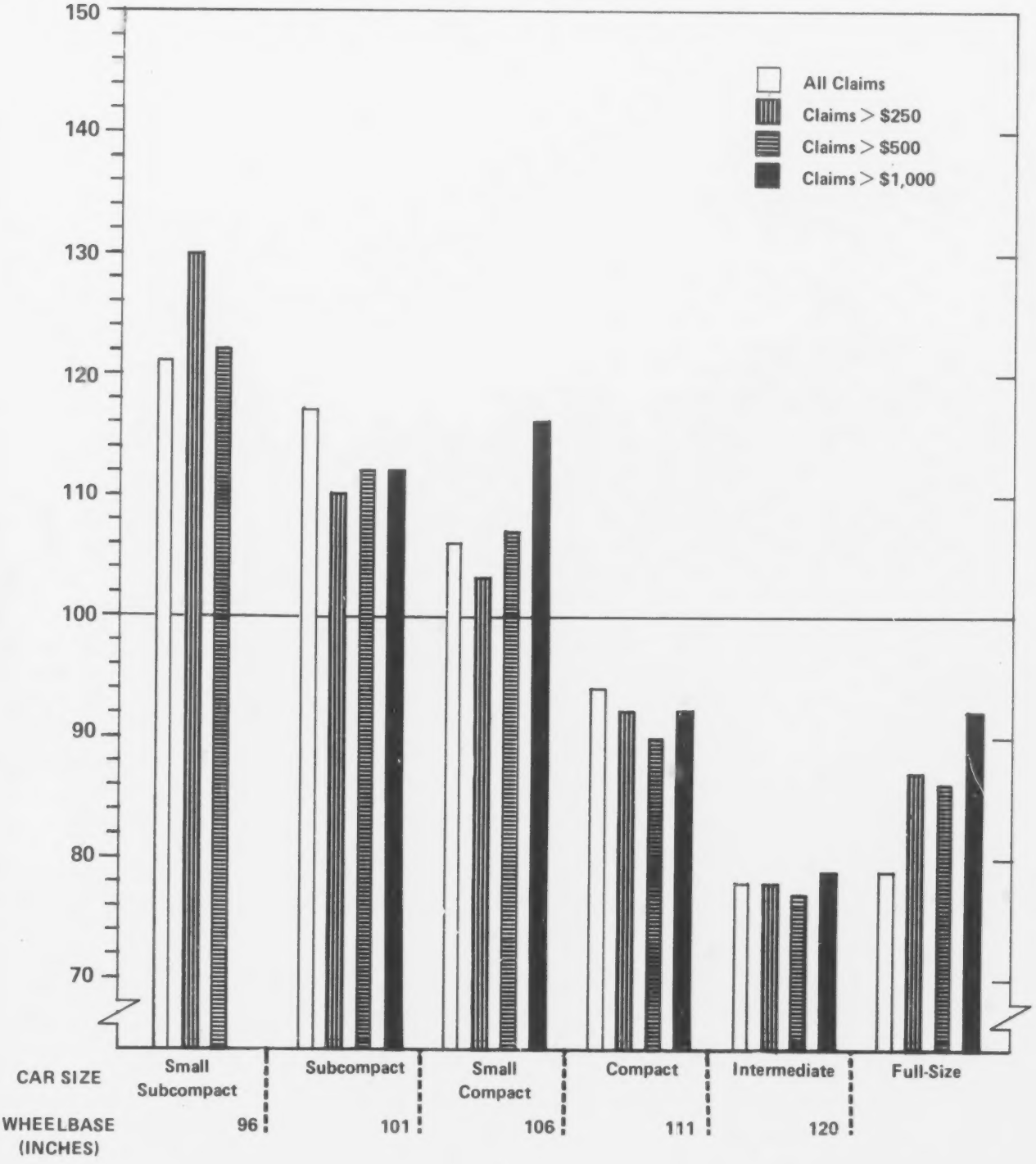
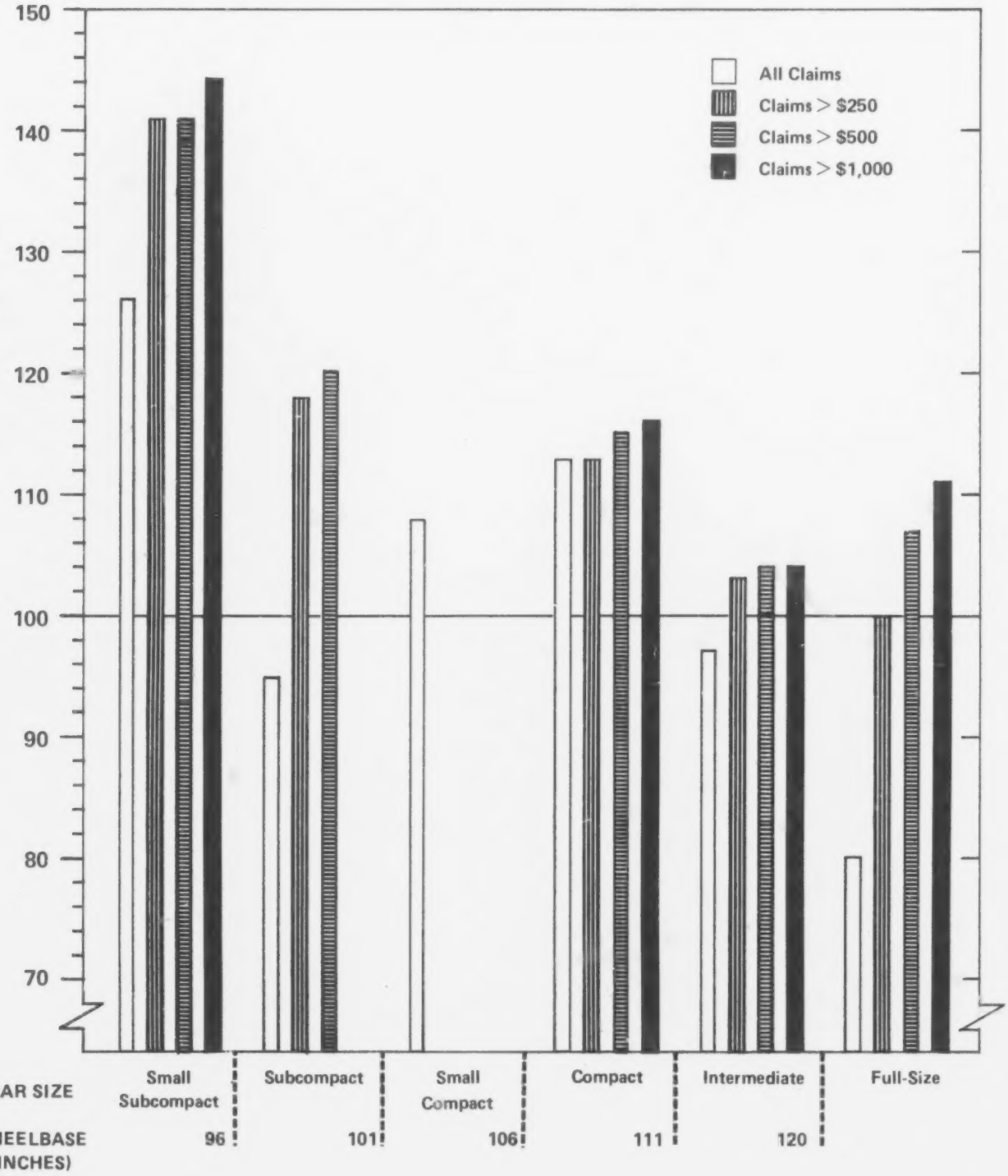


Figure 4

Personal Injury Protection Coverages
Relative Injury Claim Frequencies by Size of Claim
1977-1979 Sports and Specialty Models



are generally expressed as number of claims per 100 years of exposure. Average loss payment per claim results measure how serious, on average, the crashes are in terms of the cost involved in repairing the damage. The third category of loss is a combination of the first two and is the average loss payment per insured vehicle year. This is considered to be the most relevant single result in the assessment of Collision coverage loss experience because it accounts for both the frequency and the severity of crashes resulting in Collision coverage claims.

Table 2 summarizes the collision coverage experience of 1978 through 1980 model year passenger cars by size group and body style subgroup. Shown in Table 2 for the three model years are the relative claim frequencies, relative average loss payments per claim, and relative average loss payments per insured vehicle year. The value 100 corresponds to the all-vehicle result in each loss category for each model year. In those cases where the exposure was less than 1,000 insured vehicle years, no result is given.

Figure 5 presents the Collision coverage results for the three model years by the six car size groups. The two subcompact size classes and the full-size class had the highest relative average loss payments per insured vehicle year, and the compacts and intermediates had below average Collision coverage loss experience. The dramatic decline in the results for 1980 small compacts is a result of the introduction of the 1980 GM "X-body" cars, which have results that are better than average for their size group. The significant increase in the results for 1979 and 1980 model full-size cars is primarily the result of Ford and Chrysler models being reduced in size leaving only luxury cars produced by Cadillac and Lincoln in the full-size group beginning with the 1979 models.

Figure 6 shows the relative average loss payments per insured vehicle year for 1980 regular four-door models, regular two-door models, and sports or specialty models by car size group. (Note: the 1980 small compacts had *no* specialty models and the full-size group had *only* specialty models.) Figure 6 shows very pronounced relationships between the Collision coverage loss experience and body style – in all size classes, two-door models had higher collision losses than four-door models and sports or specialty models had even higher losses. The sports models in the subcompact classes had particularly bad Collision coverage loss experience. Table 2 shows that these same body style relationships existed for the 1978 and 1979 models.

TABLE 2

COLLISION COVERAGES
RELATIVE AVERAGE LOSSES – 1978-1980 MODELS

Size† and Body Style	1978 Models			1979 Models			1980 Models		
	A*	B*	C*	A*	B*	C*	A*	B*	C*
ALL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Small Subcompact	**108**	**107**	**116**	**106**	**105**	**111**	**106**	**101**	**107**
Regular two-door	108	104	112	104	101	105	104	99	103
Regular four-door	110	91	100	97	105	101	106	87	93
Station Wagon	91	100	91	88	95	83	84	91	77
Sports	140	149	208	151	139	208	166	132	219
Subcompact	**103**	**107**	**110**	**106**	**110**	**116**	**109**	**106**	**117**
Regular two-door	114	106	120	114	110	125	120	106	127
Regular four-door	88	98	86	87	96	83	81	95	77
Station Wagon	95	102	96	97	104	100	79	94	74
Sports	100	197	197	118	177	209	132	211	278
Small Compact	**93**	**104**	**96**	**96**	**100**	**96**	**85**	**92**	**78**
Regular two-door	96	103	98	103	102	105	90	94	84
Regular four-door	95	104	98	98	101	98	82	89	73
Station Wagon	79	101	80	76	94	71	85	90	77
Specialty	144	139	201						
Compact	**101**	**97**	**98**	**102**	**94**	**96**	**97**	**97**	**94**
Regular two-door	97	95	92	98	91	89	96	93	89
Regular four-door	84	88	73	82	85	69	76	87	66
Station Wagon	79	93	73	76	88	66	65	86	56
Specialty	122	104	127	122	102	124	115	106	122
Intermediate	**91**	**95**	**86**	**88**	**93**	**82**	**89**	**100**	**89**
Regular two-door	91	95	87	87	92	79	89	101	90
Regular four-door	80	89	71	79	87	68	81	91	74
Station Wagon	82	88	72	84	85	71	83	77	64
Specialty	107	104	111	107	106	113	102	117	119
Full-Size	**101**	**98**	**99**	**103**	**109**	**112**	**100**	**114**	**114**
Regular two-door	102	88	89						
Regular four-door	91	85	77						
Station Wagon	106	83	88						
Specialty	106	112	118	103	109	112	100	114	114

***A – Relative Claim Frequency**
***B – Relative Average Loss Payment Per Claim**
***C – Relative Average Loss Payment Per Insured Vehicle Year**

† CAR SIZE DEFINITION

Small Subcompact – Cars with wheelbases less than or equal to 96 inches.
Subcompact – Cars with wheelbases greater than 96 inches and less than or equal to 101 inches.
Small Compact – Cars with wheelbases greater than 101 inches and less than or equal to 106 inches.
Compact – Cars with wheelbases greater than 106 inches and less than or equal to 111 inches.
Intermediate – Cars with wheelbases greater than 111 inches and less than or equal to 120 inches.
Full-Size – Cars with wheelbases greater than 120 inches.

Figure 5

Collision Coverages
Relative Average Loss Payments Per Insured Vehicle Year
1978-1980 Models

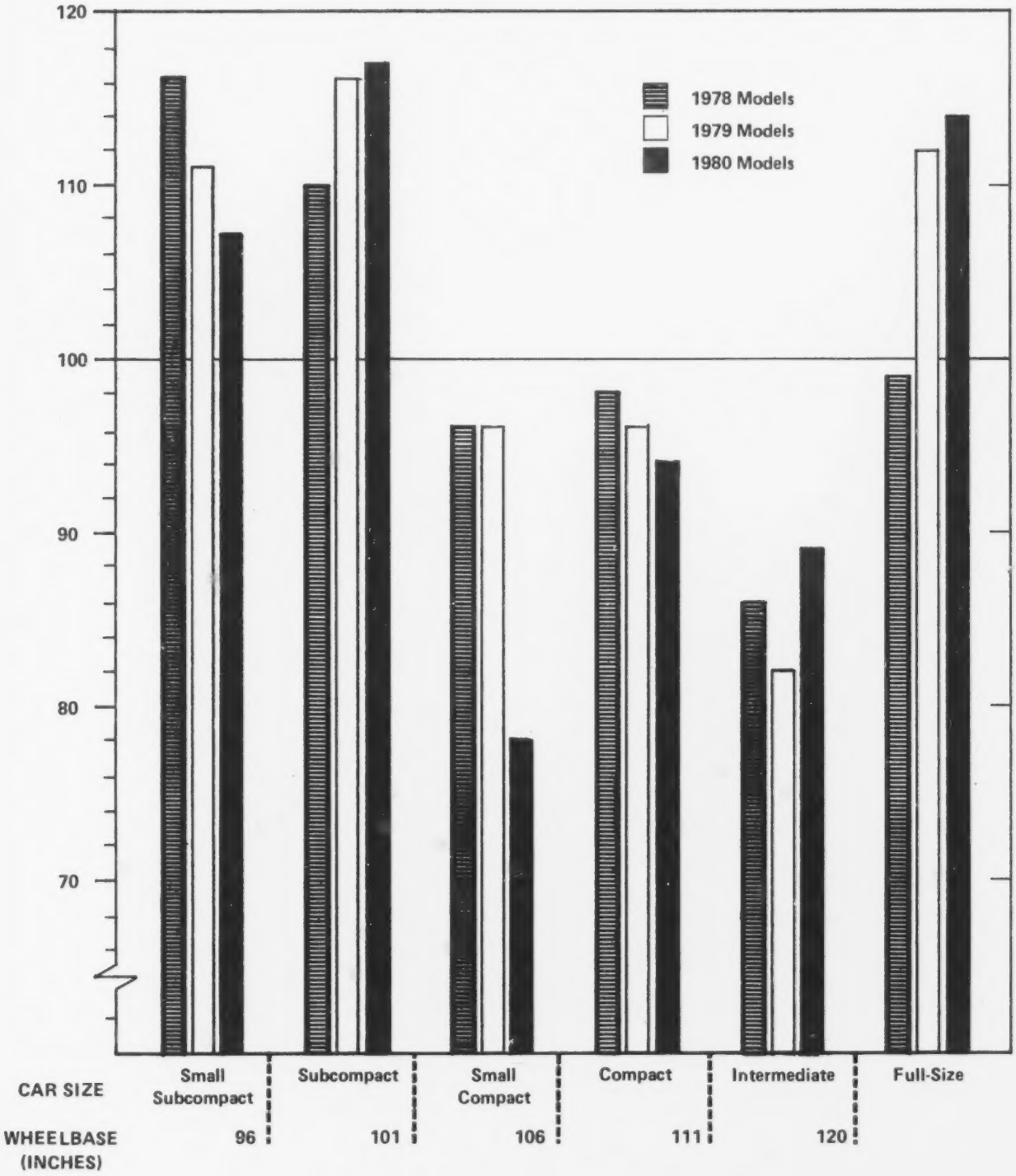
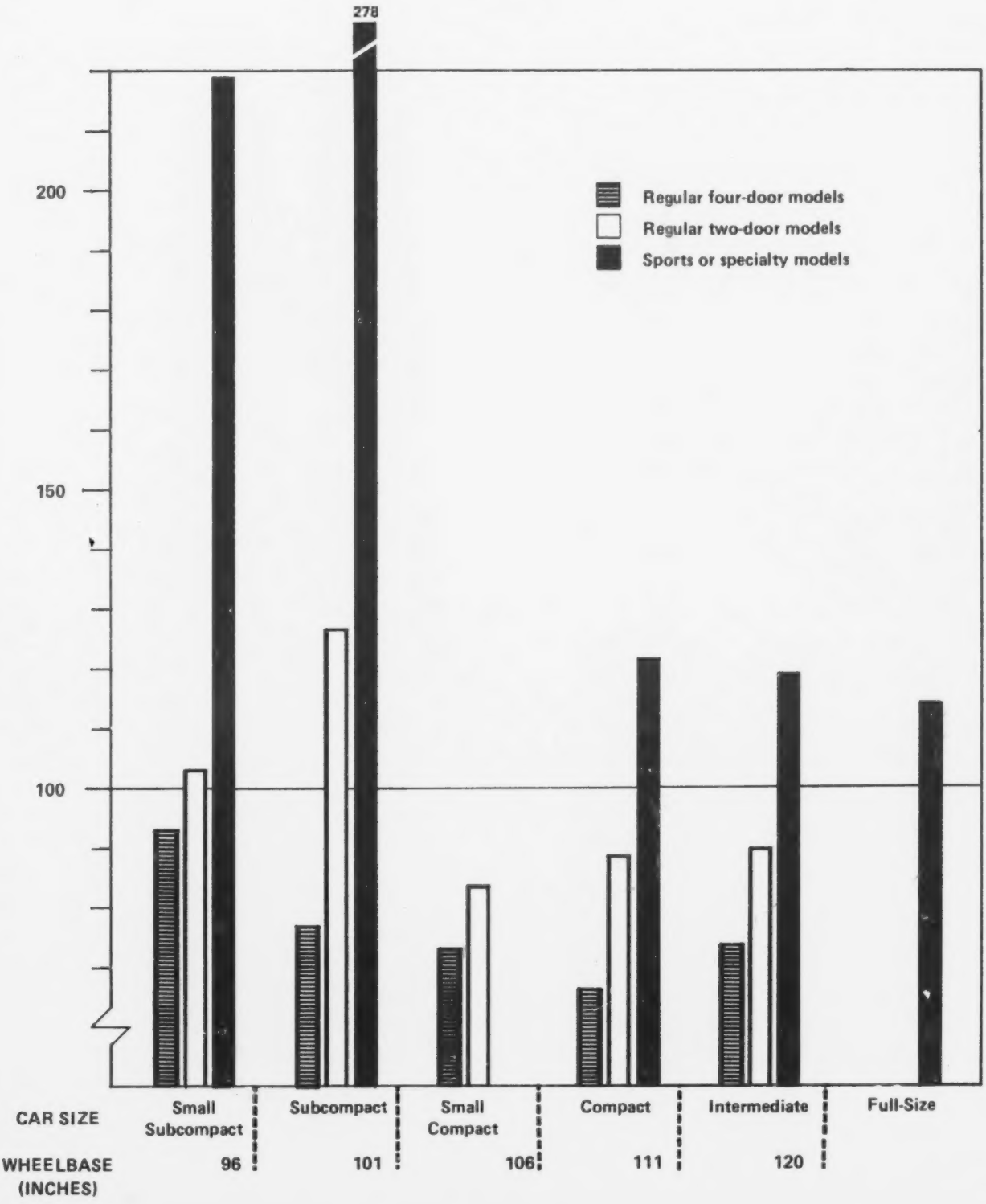


Figure 6

Collision Coverages
Relative Average Loss Payments Per Insured Vehicle Year
1980 Models



Appendix A

Vehicle Size Class Designations

Vehicle Size Class Designations

MAKE	CAR SIZE	SERIES	BODY STYLE(S)	WHEELBASE	YEARS INVOLVED
AMERICAN	SMALL SUBCOMPACT	AMX	2D	96.0	79-80
		GREMLIN	2D	96.0	77-78
		SPIRIT	2D	96.0	79-80
	SUBCOMPACT	PACER	2D/SW	100.0	77-80
	COMPACT	AMX	SPEC	108.0	78
		CONCORD	2D/4D/SW	108.0	78-80
		EAGLE	2D/4D/SW	109.0	80
		HORNET	2D/4D/SW	108.0	77
	INTERMEDIATE	MATADOR	2D	114.0	77-78
		MATADOR	4D/SW	118.0	77-78
AUDI	SUBCOMPACT	FOX	2D/4D/SW	97.2	77-79
		4000	2D/4D	99.8	80
	SMALL COMPACT	100LS	2D/4D	105.3	77
		5000	4D	105.5	78-80
BUICK	SUBCOMPACT	SKYHAWK	2D	97.0	77-80
	SMALL COMPACT	SKYLARK	2D/4D	104.9	80
	COMPACT	CENTURY/REGAL	2D	108.1	78-80
		CENTURY	4D/SW	108.1	78-80
		SKYLARK	2D/4D	111.0	77-79
	INTERMEDIATE	CENTURY	2D	112.0	77
		CENTURY	4D/SW	116.0	77
		ELECTRA	2D/4D	118.9	77-80
		ESTATE	SW	115.9	77-80
		LESABRE	2D/4D	115.9	77-80
		RIVIERA	SPEC	115.9	77-78
		RIVIERA	SPEC	114.0	79-80
CADILLAC	INTERMEDIATE	ELDORADO	SPEC	114.0	79-80
		SEVILLE	SPEC	114.3	77-80
	FULL-SIZE	BROUGHAM 2D/4D	SPEC	121.5	80
		DE VILLE 2D/4D	SPEC	121.5	77-80
		ELDORADO	SPEC	126.3	77-78
		FLEETWOOD BROUGHAM	SPEC	121.5	77-79
		FLEETWOOD LIMOUSINE	SPEC	144.5	77-80

MAKE	CAR SIZE	SERIES	BODY STYLE(S)	WHEELBASE	YEARS INVOLVED
CHEVROLET	SMALL SUBCOMPACT	CHEVETTE	2D	94.3	77-80
	SUBCOMPACT	CHEVETTE	4D	97.3	78-80
		CORVETTE	SPORTS	98.0	77-80
		MONZA	2D	97.0	77-80
		MONZA	SW	97.0	78-79
		VEGA	2D/SW	97.0	77
	SMALL COMPACT	CITATION	2D/4D	104.9	80
	COMPACT	CAMARO	SPEC	108.0	77-80
		MALIBU	2D/4D/SW	108.1	78-80
		MONTE CARLO	SPEC	108.1	78-80
		NOVA	2D/4D	111.0	77-79
	INTERMEDIATE	CAPRICE	2D/4D/SW	116.0	77-80
		CHEVELLE	2D	112.0	77
		CHEVELLE	4D/SW	116.0	77
		IMPALA	2D/4D/SW	116.0	77-80
		MONTE CARLO	SPEC	116.0	77
CHRYSLER	COMPACT	LE BARON	2D	108.7	80
	INTERMEDIATE	CORDOBA	SPEC	115.0	77-79
		CORDOBA	SPEC	112.7	80
		LE BARON	2D	112.7	77-79
		LE BARON	4D	112.7	77-80
		LE BARON	SW	112.7	78-80
		NEW YORKER	4D	118.5	79-80
		NEWPORT	4D	118.5	79-80
	FULL-SIZE	NEW YORKER	2D/4D	124.0	77-78
		NEWPORT	2D/4D	124.0	77-78
		TOWN & COUNTRY	2D/4D/SW	124.0	77
DATSUN	SMALL SUBCOMPACT	B210	2D/4D	92.1	77-78
		F-10	2D/SW	94.3	77-78
		200SX	2D	92.1	77-79
		200SX	2D	94.5	80
		210	2D/4D/SW	92.1	79-80
		280Z	SPORTS	90.7	77-78
		280ZX	SPORTS	91.3	79-80
		310	2D	94.3	79-80
		310	4D	94.3	80
		510	2D/4D/SW	94.5	78-80
	SUBCOMPACT	280ZX 2+2	SPORTS	99.2	79-80
		610	2D/4D	98.4	77
		710	2D/4D	96.5	77
	SMALL COMPACT	280Z 2+2	SPEC	102.6	77-78
		810	4D/SW	104.3	77-78
		810	2D/4D/SW	104.3	79-80

MAKE	CAR SIZE	SERIES	BODY STYLE(S)	WHEELBASE	YEARS INVOLVED
DODGE	SMALL SUBCOMPACT	COLT	2D/4D	92.1	77-79
		COLT (FWD)	2D	90.6	79-80
		COLT	SW	95.3	77
		COLT HARDTOP	2D	95.3	77
	SUBCOMPACT	CHALLENGER	2D	99.0	78-80
		COLT	SW	99.0	78-80
		OMNI	4D	99.2	78-80
		OMNI	2D	96.7	79-80
	COMPACT	ASPEN	2D	108.7	77-80
		DIPLOMAT	2D	108.7	80
	INTERMEDIATE	ASPEN	4D/SW	112.7	77-80
		CHARGER	SPEC	115.0	77-78
		DIPLOMAT	2D	112.7	77-79
		DIPLOMAT	4D	112.7	77-80
		DIPLOMAT	SW	112.7	78-80
		MAGNUM XE	SPEC	114.9	79
		MIRADA	SPEC	112.7	80
		MONACO	2D	115.0	77-78
		MONACO	4D/SW	117.5	77-78
		ST. REGIS	4D	118.5	79-80
	FULL-SIZE	ROYAL MONACO	2D/4D	121.4	77
		ROYAL MONACO	SW	124.0	77
FIAT	SMALL SUBCOMPACT	SPIDER	SPORTS	89.7	77-80
		X 1/9	SPORTS	86.7	77-80
		128	2D	87.5	77-79
	SUBCOMPACT	BRAVA/131	2D/4D	98.0	77-80
		BRAVA/131	SW	98.0	77-79
		STRADA	2D/4D	96.4	79-80
		128	4D	96.4	77-79
		128	SW	96.4	77

MAKE	CAR SIZE	SERIES	BODY STYLE(S)	WHEELBASE	YEARS INVOLVED
FORD	SMALL SUBCOMPACT	FIESTA	2D	90.0	78-80
		PINTO	2D	94.5	77-80
		PINTO	SW	94.8	77-80
	SUBCOMPACT	MUSTANG	2D	100.4	79-80
		MUSTANG II	2D	96.2	77-78
	SMALL COMPACT	FAIRMONT	2D/4D/SW	105.5	78-80
		MAVERICK	2D	103.0	77
	COMPACT	GRANADA	2D/4D	109.9	77-80
		MAVERICK	4D	109.9	77
		THUNDERBIRD	SPEC	108.4	80
	INTERMEDIATE	LTD	2D/4D/SW	114.4	79-80
		LTD II	2D	114.0	77-79
		LTD II	4D	118.0	77-79
		LTD II	SW	118.0	77
		THUNDERBIRD	SPEC	114.0	77-79
	FULL-SIZE	LTD	2D/4D/SW	121.0	77-78
HONDA	SMALL SUBCOMPACT	ACCORD	2D	93.7	77-80
		ACCORD	4D	93.7	79-80
		CIVIC	2D	86.6	77-79
		CIVIC	2D	88.6	80
		CIVIC	SW	89.8	77-79
		CIVIC	SW	91.3	80
		PRELUDE	2D	91.3	79-80
LINCOLN	COMPACT	VERSAILLES	SPEC	109.9	77-80
	INTERMEDIATE	CONTINENTAL 2D/4D	SPEC	117.3	80
		MARK VI 2D	SPEC	114.3	80
		MARK VI 4D	SPEC	117.3	80
	FULL-SIZE	CONTINENTAL 2D/4D	SPEC	127.2	77-79
		MARK V	SPEC	120.4	77-79
MAZDA	SMALL SUBCOMPACT	GLC	2D/4D	91.0	77-80
		GLC	SW	91.0	79-80
		RX-3	2D	91.0	77-78
		RX7	SPORTS	95.0	79-80
		808/1300	2D/4D/SW	91.0	77
		808/1600	2D/4D/SW	91.0	77
	SUBCOMPACT	COSMO	2D	99.0	77-78
		RX-4	4D/SW	99.0	77-78
		626	2D/4D	99.0	79-80

MAKE	CAR SIZE	SERIES	BODY STYLE(S)	WHEELBASE	YEARS INVOLVED
MERCURY	SMALL SUBCOMPACT	BOBCAT	2D	94.5	77-80
		BOBCAT	SW	94.8	77-80
	SUBCOMPACT	CAPRI	2D	100.9	77
		CAPRI	2D	100.4	79-80
	SMALL COMPACT	COMET	2D	103.0	77
		ZEPHYR	2D/4D/SW	105.5	78-80
	COMPACT	COMET	4D	109.9	77
		COUGAR XR-7	SPEC	108.0	80
		MONARCH	2D/4D	109.9	77-80
	INTERMEDIATE	COUGAR	2D	114.0	77-79
		COUGAR	4D/SW	118.0	77
		COUGAR	4D	114.0	78-79
		COUGAR XR-7	SPEC	114.0	77-79
		MARQUIS	2D/4D/SW	114.4	79-80
	FULL-SIZE	MARQUIS	2D/4D	124.0	77-78
		MARQUIS	SW	121.0	77
		MARQUIS	SW	124.0	78
MG	SMALL SUBCOMPACT	MG MIDGET	SPORTS	80.0	77-79
		MGB	SPORTS	91.1	77-80
OLDSMOBILE	SUBCOMPACT	STARFIRE	2D	97.0	77-80
	SMALL COMPACT	OMEGA	2D/4D	105.0	80
	COMPACT	CUTLASS	2D/4D/SW	108.1	78-80
		OMEGA	2D/4D	111.0	77-79
	INTERMEDIATE	CUSTOM CRUISER	SW	116.0	77,79-80
		CUSTOM CRUISER	SW	119.0	78
		CUTLASS	2D	112.0	77
		CUTLASS	4D/SW	116.0	77
		DELTA 88	2D/4D	116.0	77-80
		NINETY EIGHT	2D/4D	119.0	77-80
		TORONADO	SPEC	114.0	79-80
	FULL-SIZE	TORONADO	SPEC	122.0	77-78
OPEL	SMALL SUBCOMPACT	COUPE	2D	94.3	77-79
		SEDAN	4D	94.3	77-79

MAKE	CAR SIZE	SERIES	BODY STYLE(S)	WHEELBASE	YEARS INVOLVED
PLYMOUTH	SMALL SUBCOMPACT	ARROW	2D	92.1	77-80
		CHAMP	2D	90.6	79-80
	SUBCOMPACT	HORIZON	2D	96.7	79-80
		HORIZON	4D	99.2	78-80
		SAPPORO	2D	99.0	78-80
	COMPACT	VOLARE	2D	108.7	77-80
	INTERMEDIATE	FURY	2D	115.0	77-78
		FURY	4D/SW	117.5	77-78
		GRAN FURY	4D	118.5	80
		VOLARE	4D/SW	112.7	77-80
	FULL-SIZE	GRAN FURY	2D/4D	121.4	77
		GRAN FURY	SW	124.0	77
PONTIAC	SUBCOMPACT	ASTRE	2D/SW	97.0	77
		SUNBIRD	2D	97.0	77-80
		SUNBIRD	SW	97.0	78-79
	SMALL COMPACT	PHOENIX	2D/4D	104.9	80
	COMPACT	FIREBIRD	SPEC	108.1	77-80
		GRAND AM	2D	108.1	78-80
		GRAND AM	4D	108.1	78-79
		GRAND PRIX	SPEC	108.1	78-80
		LEMANS	2D/4D/SW	108.1	78-80
		PHOENIX	2D/4D	111.1*	77-79
		VENTURA	2D/4D	111.1*	77
	INTERMEDIATE	BONNEVILLE	2D/4D/SW	116.0	77-80
		CATALINA	2D/4D/SW	116.0	77-80
		GRAND PRIX	SPEC	116.0	77
		LEMANS	2D	112.0	77
		LEMANS	4D/SW	116.0	77
PORSCHE	SMALL SUBCOMPACT	911 COUPE	SPORTS	89.4	77-80
		924 COUPE	SPORTS	94.5	77-80
	SUBCOMPACT	928 COUPE	SPORTS	98.4	78-80

*THESE VEHICLES ARE CLASSIFIED AS COMPACT EVEN THOUGH THE ACTUAL WHEELBASES ARE 111.1 INCHES. THE BASIC VEHICLE IS THE SAME AS THE CHEVROLET NOVA, OLDSMOBILE OMEGA, AND BUICK SKYLARK, ALL WITH WHEELBASES OF 111.0 INCHES.

MAKE	CAR SIZE	SERIES	BODY STYLE(S)	WHEELBASE	YEARS INVOLVED
SUBARU	SUBCOMPACT	DL	2D/4D/SW	96.9	77-79
		GF	2D	96.9	77-79
		STANDARD	2D	96.9	77-79
TOYOTA	SMALL SUBCOMPACT	COROLLA	2D/4D/SW	93.3	77-79
		COROLLA	2D/4D	94.5	80
	SUBCOMPACT	CELICA	2D	98.3	77-80
		COROLLA TERCEL	2D	98.4	80
		CORONA	2D/4D/SW	98.4	77-78
		CORONA	4D/SW	99.4	79-80
	SMALL COMPACT	CELICA SUPRA	2D	103.5	79-80
		CRESSIDA	4D/SW	104.1	78-80
VOLKSWAGEN	SMALL SUBCOMPACT	BEETLE	2D	94.5	77
		BEETLE CONVERTIBLE	2D	94.5	78-79
		JETTA	2D/4D	94.4	80
		RABBIT CONVERTIBLE	2D	94.5	80
		RABBIT	2D/4D	94.5	77-80
		SCIROCCO	2D	94.5	77-80
	SUBCOMPACT	DASHER	2D/4D/SW	97.2	77-80

List of Publications

Other research reports published by the Highway Loss Data Institute are:

R72-1 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1972 Models,* June 1973.

R73-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1973 Models Compared with 1972 Models,* September 1973.

R73-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models,* March 1974.

R73-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Two Years,* December 1974.

R73-4 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Three Years,* December 1975.

R74-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1974 Models,* May 1974.

R74-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Year,* December 1974.

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R80-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1980 Models,* June 1980.

R80-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1980 Models During Their First Year, 1979 Models During Their First Two Years, 1978 Models During Their First Three Years,* December 1980.

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V79-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups and Utility Vehicles, 1979 Models During Their First Year, 1978 Models During Their First Two Years,* April 1980.

V79-2 *Automobile Insurance Losses, Personal Injury Protection Coverages; Claim Frequency Results by Size of Claim for 1977, 1978, and 1979 Vans, Pickup Trucks, and Utility Vehicles,* October 1980.

V79-3 *Insurance Theft Losses; Vans, Pickups, and Utility Vehicles, 1979 Models.* May 1981.

V80-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups, and Utility Vehicles, 1980 Models During Their First Year, 1979 Models During Their First Two Years, 1978 Models During Their First Three Years,* December 1980.

I 75-1 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1974 and 1975 Models,* June 1976.

I 75-2 *Automobile Insurance Loss[illegible]centage of Collision Claims with Associated Injury Claims for 1974 and 1975 Models,* Mar[illegible]7.

I 76-1 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1974, 1975, and 1976 Models,* November 1977.

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A-1 *Automobile Insurance Losses, Collision Coverages; A Comparison of Results for 1972 and 1973 Models*, May 1974.

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A-10 *Automobile Insurance Losses, Injury Coverages; Comparisons of Claim Frequencies of Volkswagen Rabbits with Automatic and Manual Seat Belts, 1975, 1976, and 1977 Models*, June 1979.

A-11 *Automobile Insurance Losses, Collision Coverages; The Consistency of the Loss Experience of Specific Vehicles Produced in Several Years, 1975 To 1978 Models*, June 1979.

A-12 *Automobile Insurance Losses, Collision Coverages; An Assessment of the Effects of the Federal Safety Bumper Standard on the Losses for 1972 Through 1978 Models*, June 1980.

T79-1 *Automobile Insurance Theft Losses by Make and Series, 1979 Models*, June 1980.

T80-1 *Automobile Insurance Theft Losses by Make and Series; 1979 and 1980 Models.* April 1981.

Automobile Insurance Losses
Personal Injury Protection and Collision Coverages

COMPARISONS OF THE LOSS EXPERIENCE OF TWO- AND FOUR-DOOR CARS 1978, 1979, AND 1980 MODELS

Research Report HLDI A-14
June 1981

Highway Loss Data Institute
Watergate Six Hundred
Washington, D.C. 20037

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Summary

This report analyzes differences in the injury and collision* loss experience between two- and four-door cars. In particular, it examines the influence of three non-vehicle factors – insured driver age, vehicle density of the garaging location, and vehicle use – to determine whether they contribute to the repeatedly documented differences in loss experience between these two body styles.

Results were based on the personal injury protection and collision coverage experience of four popular cars that were marketed in two- and four-door versions. Injury results are presented for 1978 and 1979 models and collision results for 1978-1980 models.

Principal Findings

- In virtually every loss category two-door cars had worse experiences than corresponding four-door cars. These differences were most pronounced for the collision coverage results, but were also present for most of the injury results. There was no evidence that the non-vehicle factors studied were significantly contributing to these differences.

- Although driver age had a strong influence on the results, it did not account for most of the differences in loss experience between the two car body styles.

- Vehicle density and vehicle use also influenced the results but did not contribute to the differences in loss experience by body style.

* In this report, the term *collision* refers to the particular type of insurance sold as "Collision" coverage.

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Introduction

The Highway Loss Data Institute (HLDI) is a non-profit, public service organization that gathers, analyzes, and publishes insurance data concerned with the human and economic losses associated with motor vehicle use, and, especially with the ways such losses vary among different kinds of vehicles.

The results of many previously published HLDI reports indicate that both injury and collision coverage losses tend to be greater for the two-door passenger cars than for the corresponding four-door models. This report analyzes in detail differences in loss experience by body style. In particular, it examines the influence of three non-vehicle factors – insured driver age group, vehicle density of the garaging location, and vehicle use – on the loss experience of corresponding two- and four-door models and considers whether these factors, either singly, or, in combination, contribute to the reported differences in loss experience between body styles.

The results of this study are based on personal injury protection (PIP) and collision coverage and loss data supplied by ten insurers: Aetna, Allstate, GEICO, Kemper, Liberty Mutual, Nationwide, Prudential, State Farm, Travelers, and USAA. A description of the sources and nature of the data is presented in Appendix B. The data analysis methods used in the preparation of this report are detailed in Appendix C. Definitions are provided in Appendix D.

It is intended that the dissemination of this and other HLDI reports will contribute to research into ways for reducing vehicle-related damage to people and property, and also provide the public with information relating to the differences in the crash damage produced by different kinds of vehicles.

Results and Discussion

This report is based on injury and collision coverage results from four popular cars that were marketed with both two- and four-door versions. It summarizes the effects of three non-vehicle factors – insured driver age group, vehicle density of the garaging location, and vehicle use – on the loss experience.

The four popular passenger cars whose insurance loss experience form the basis of this report are the Chevrolet Chevette, Chevrolet Malibu, Ford Fairmont, and Plymouth Horizon*. Injury results are presented for 1978 and 1979 models and collision results are presented for 1978, 1979, and 1980 models. To ensure that differences in the mix of exposure among the four cars within each body style were not distorting comparisons between the two body styles, the results were standardized so that the mix of exposure from each of the four cars was the same for the two- and four-door results (see Appendix C for details).

Operator Age Groups

One non-vehicle factor that might contribute to the reported body style differences in loss experience is the driver rated as the principal operator for insurance purposes. Two-door models consistently have more exposure with younger operators than corresponding four-door models and HLDI results are standardized to eliminate the effects of operator age group differences. The influence of driver age, however, might not be totally eliminated because HLDI analyses use only two driver age groups and there could be differences in the age distributions within each of the age groups. Younger drivers have more frequent and severe crashes than older drivers; hence, if two-door models have a significantly greater percentage of their exposure among the very youngest drivers within the youthful operator group, this could result in their higher reported losses.

Tables 1 and 2 present detailed distributions of exposure by body style for five driver age groups within the two principal operator age groups. These five classes represent as small an age grouping as possible with the HLDI data. Tables 1 and 2 show that two-door models had a greater percentage of their exposure than four-door models in each of the subgroups within the youthful operator group; however, this difference was smallest for the youngest operator age group – drivers aged 17-20. Thus, the poorer loss experience of two-door cars is not likely to be attributable to differences in the mix of ages within the youthful operator age group, since the operator group which generally has the worst loss experience – drivers aged 17-20 – had the smallest excess of exposure for two-door models.

Table 3 shows the injury loss experience by body style for four of the five operator age groups. Results are not presented for the "all other youthful" driver age group since neither the two-door nor the four-door models had sufficient exposure to meet the reporting threshold of 5,000 insured vehicle years. It is clear from these results that operator age has a strong influence on injury loss experience. The youngest operators had the worst injury experience in the overall injury claim size category and the oldest operators had the best. The results also show there were consistent differences in loss experience by body style. In each operator age group, two-door models had higher overall injury loss results than four-door models. The percentage differences between the results for the two body styles tended to decrease for the claims which exceeded $500.

Table 4 and Figures 1 through 3 show the collision coverage loss experience by body style for each of the five operator age groups. As in the case of the injury results, there were very strong relationships between the collision coverage results and driver age. As before, the youngest operators had the worst results while the oldest had the best. *(cont'd on page 11)*

*Results for the Plymouth Horizon are presented for the 1979 and 1980 model years only since the two-door model was not produced in the 1978 model year.

Table 1
Personal Injury Protection Coverages
Mix of Exposure by Operator Age Group and Body Style
1978-1979 Models

	Operator Age Group	Body Style	Exposure (Insured Vehicle Years)	Percentage of Exposure	Ratio of 2Dr:4Dr Exposure
Youthful Operator	17-20	2 Dr. 4 Dr.	17,019 13,655	8.3 6.7	1.2
	21-24	2 Dr. 4 Dr.	18,145 9,476	8.8 4.6	1.9
	All Other Youthful	2 Dr. 4 Dr.	4,311 2,082	2.1 1.0	2.1
No Youthful Operator	25-64	2 Dr. 4 Dr.	157,241 164,082	76.4 80.2	1.0
	⩾ 65	2 Dr. 4 Dr.	9,208 15,159	4.5 7.4	0.6
	Total	2 Dr. 4 Dr.	205,924 204,454	100.0 100.0	

NOTES:

- Results are based on the loss experience of the following 1978-1979 two- and four- door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

Table 2
Collision Coverages
Mix of Exposure by Operator Age Group and Body Style
1978-1980 Models

	Operator Age Group	Body Style	Exposure (Insured Vehicle Years)	Percentage of Exposure	Ratio of 2Dr:4Dr Exposure
Youthful Operator	17-20	2 Dr. 4 Dr.	45,801 34,845	8.6 6.7	1.3
	21-24	2 Dr. 4 Dr.	49,140 24,689	9.2 4.7	2.0
	All Other Youthful	2 Dr. 4 Dr.	9,732 4,791	1.8 0.9	2.0
No Youthful Operator	25-64	2 Dr. 4 Dr.	404,431 416,413	75.8 80.0	0.9
	≥65	2 Dr. 4 Dr.	24,272 39,938	4.6 7.7	0.6
	Total	2 Dr. 4 Dr.	533,376 520,676	100.0 100.0	

NOTES:

- Results are based on the loss experience of the following 1978-1980 two- and four- door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

Table 3
Personal Injury Protection Coverages
Claim Frequency Results by Operator Age Group and Body Style
1978-1979 Models

	Operator Age Group	Body Style	Claim Frequency by Size of Claim (Per 1000 Insured Vehicle Years)			
			All	> $250	>$500	> $1000
Youthful Operator	17-20	2 Dr.	33.4	13.0		
		4 Dr.	28.3	10.2		
	21-24	2 Dr.	24.1			
		4 Dr.	23.8			
	All Other Youthful	2 Dr.				
		4 Dr.				
No Youthful Operator	25-64	2 Dr.	18.9	7.7	4.7	2.9
		4 Dr.	16.9	6.8	4.3	2.7
	≥65	2 Dr.	13.5			
		4 Dr.	13.0			

NOTES:

- Minimum exposure thresholds for reporting:

All claims	5,000 vehicle years
Claims >$250	10,000 vehicle years
Claims >$500	15,000 vehicle years
Claims >$1000	25,000 vehicle years

- Results are based on the loss experience of the following 1978-1979 two- and four-door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

- All results are standardized, see Appendix C for details.

Table 4
Collision Coverages
Loss Results by Operator Age Group and Body Style
1978-1980 Models

	Operator Age Group	Body Style	Claim Frequency Per 100 Insured Vehicle Years	Average Loss Payment Per Claim	Average Loss Payment Per Insured Vehicle Year
Youthful Operator	17-20	2 Dr.	16.4	$1160	$191
		4 Dr.	13.6	1095	149
	21-24	2 Dr.	12.1	1054	128
		4 Dr.	11.0	1076	119
	All Other Youthful	2 Dr.	12.2	1158	139
		4 Dr.	11.2	1100	123
No Youthful Operator	25-64	2 Dr.	8.4	988	84
		4 Dr.	7.8	924	72
	≥65	2 Dr.	7.5	887	68
		4 Dr.	6.8	856	59

NOTES:

- Results are based on the loss experience of the following 1978-1980 two- and four-door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.
- All results are standardized; see Appendix C for details.

Figure 1
Collision Coverages
Claim Frequency Results by Operator Age Group and Body Style
1978-1980 Models

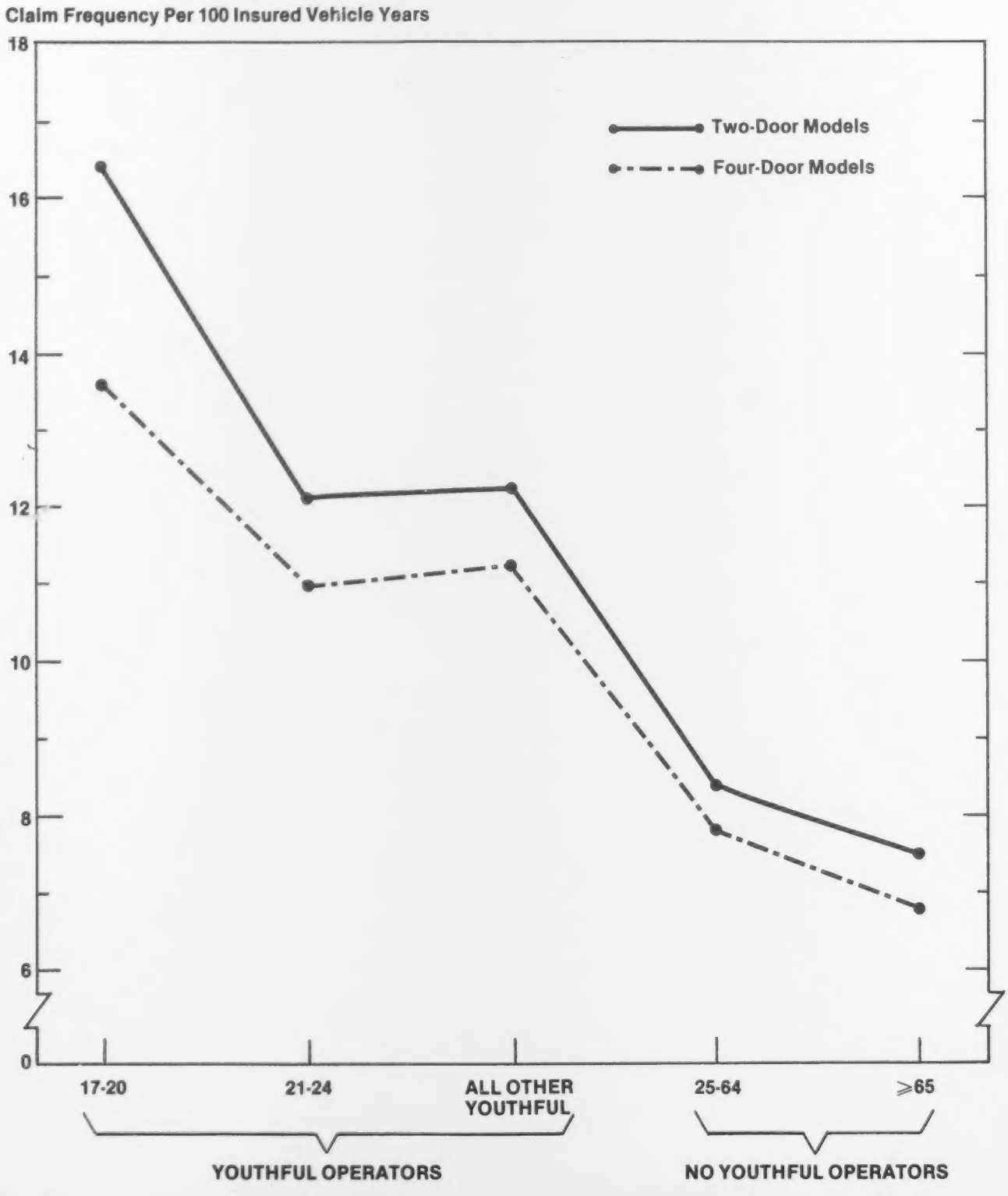


Figure 2
Collision Coverages
Average Loss Payment Per Claim by Operator Age Group and Body Style
1978-1980 Models

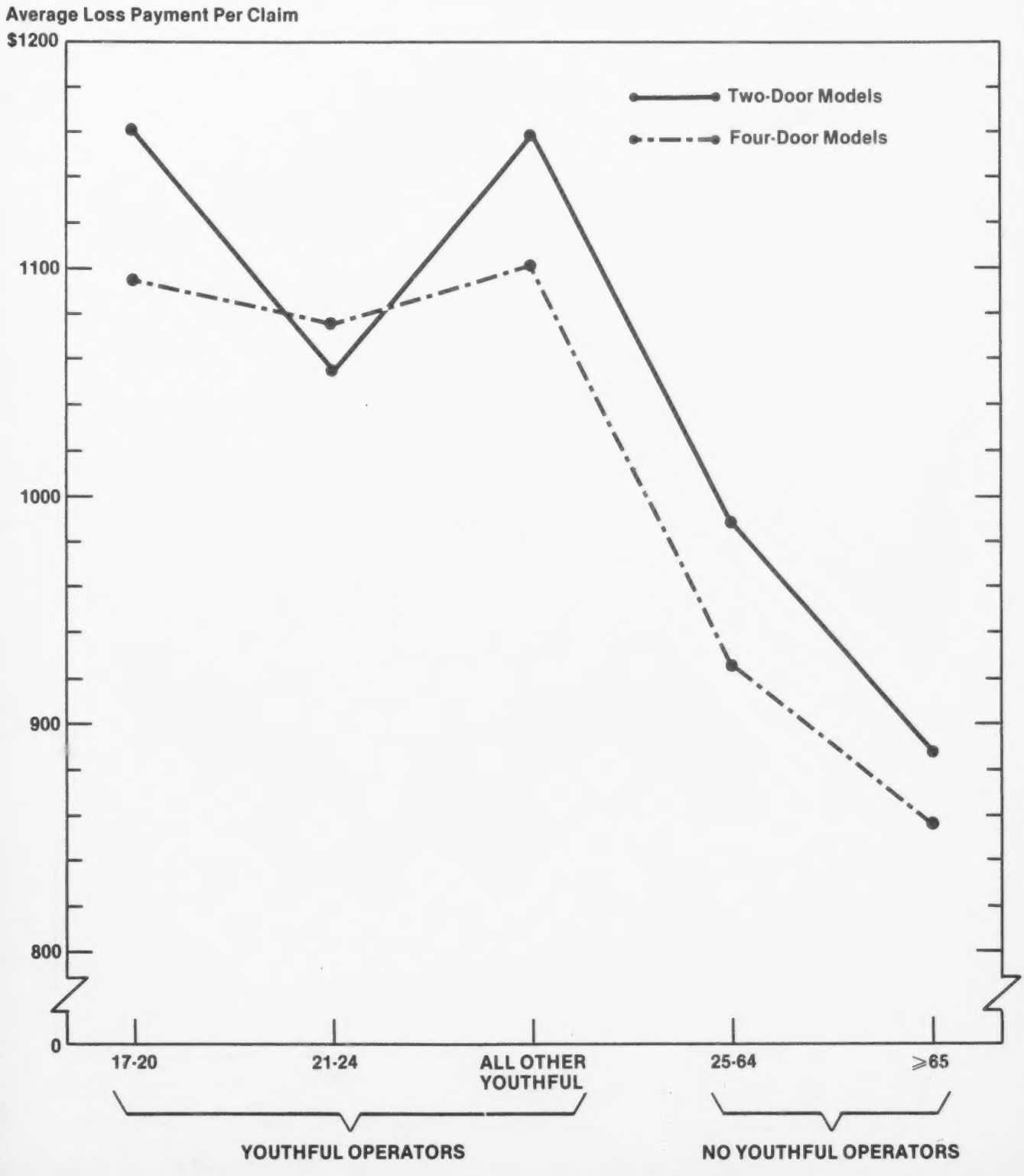
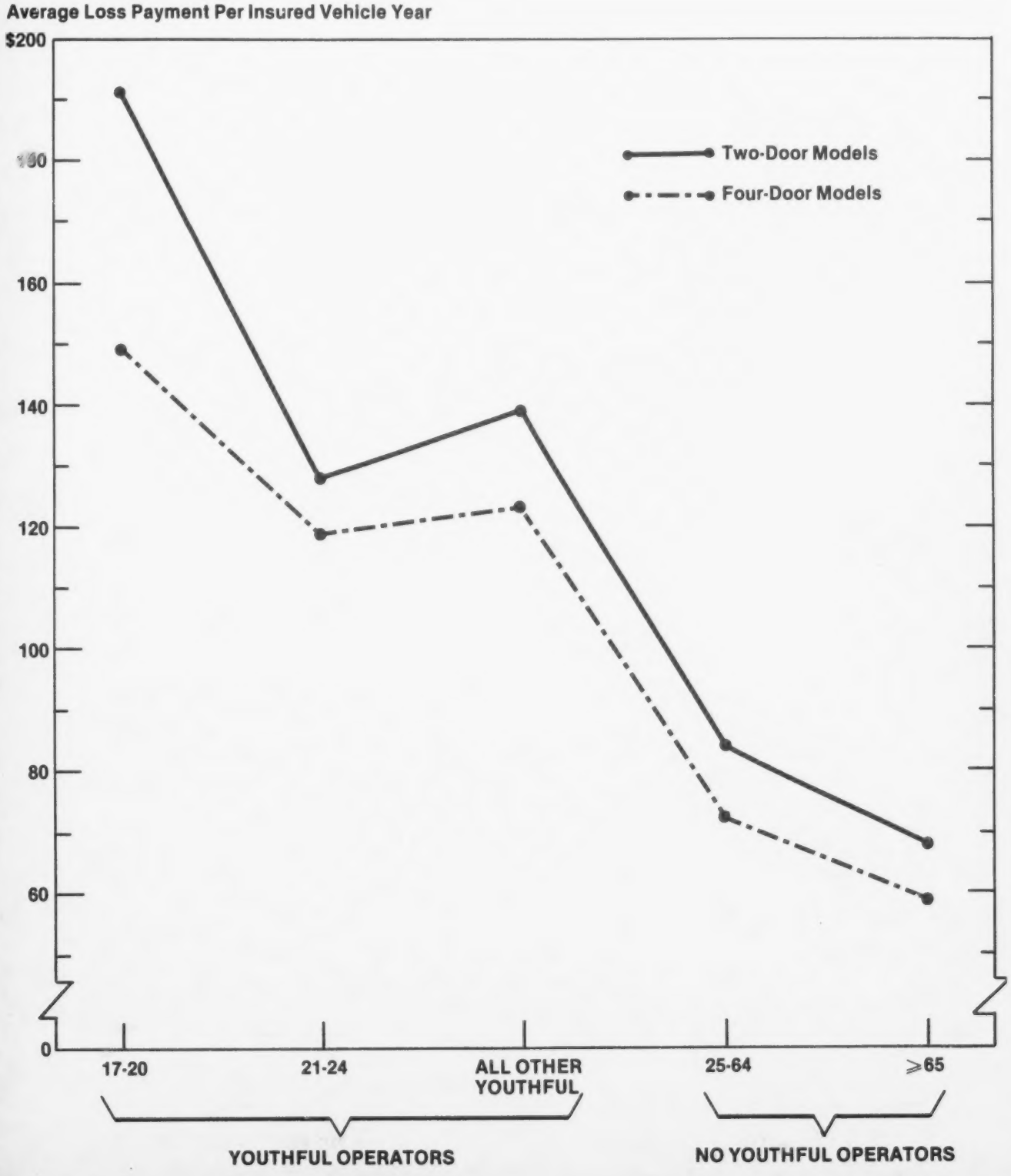


Figure 3
Collision Coverages
Average Loss Payment Per Insured Vehicle Year by Operator Age Group and Body Style
1978-1980 Models



Like the injury coverage results, there were also very consistent differences in the results between the two body styles. Each result in every operator age group, with the single exception of the average loss payment results for 21-24 year old operators, was lower for the four-door models.

Similar results are reflected in the comparisons of collision loss results for individual models in Appendix A1. In most cases, for each age group, two-door models had greater losses than corresponding four-door models. Again, the major exceptions were for drivers aged 21-24. Among this age group, collision coverage average loss payments per claim were generally higher for four-door models.

The loss results by operator age group strongly suggest that driver age differences are not a significant factor in the differences in the results by body style. For drivers of the same age, two-door models consistently had higher overall injury losses as well as higher collision losses. These differences between results for the two body styles were most pronounced for the 17-20 year old age group. It should be noted, however, that within particular age groups, there still could be some variations by age, sex, and marital status. Since operator age is such an important determinant of loss experience and because there are differences between the two body styles in the mix of exposure by operator age group, it is important that results be standardized for this factor. All subsequent results in this report were standardized so that there was the same mix of exposure for each of the five age groups contributing to each two- and four-door result.

Vehicle Density

Another non-vehicle factor that can influence loss experience is a vehicle's normal garaging location. Previous HLDI reports* indicated that the number of registered passenger vehicles per square mile in the reported garaging locations of vehicles influenced the collision coverage loss experience. Although there was a slight tendency for vehicles of particular size classes to be associated with garaging locations in particular density groups, these differences were not marked and were not significantly distorting comparisons among vehicle types.

Tables 5 and 6 show that the distribution of exposure by vehicle density did not vary substantially between body style groups. Four-door models, though, did have slightly more exposure in low density areas than two-door models.

Table 7 and Figure 4 summarize the injury loss experience by vehicle density and body style. The relationships between vehicle density and injury claim frequency were not pronounced, but for every claim size category the injury claim frequency results were highest in the areas of greatest vehicle density. This table and figure also show that in all vehicle densities four-door models had lower overall injury claim frequencies than two-door models. Body style differences in loss experience, however, were not as consistent for the other injury claim size categories.

Table 8 and Figures 5 through 7 summarize the collision coverage loss experience by vehicle density and body style. Claim frequency results *increased*, but average payment per claim results *decreased* with increasing density. In every instance the two-door results were worse than the four-door results.

Appendices A2 and A3 present the loss experience results of each corresponding two-door and four-door model. In most cases, the two-door models had worse loss results than the four-door models.

(cont'd on page 19)

*Automobile Insurance Losses, Collision Coverages, Relationships Between Losses and Vehicle Density, 1972 and 1973 Models, September 1974.

*Automobile Insurance Losses, Collision Coverages, Relationships Between Losses and Vehicle Density, 1974 and 1975 Models, December 1975.

Table 5
Personal Injury Protection Coverages
Mix of Exposure by Vehicle Density and Body Style
1978-1979 Models

Vehicle Density	Body Style	Exposure (Insured Vehicle Years)	Percentage of Exposure
0-50 Vehicles Per Square Mile	2 Dr.	60,414	29
	4 Dr.	64,317	32
51-600 Vehicles Per Square Mile	2 Dr.	85,061	41
	4 Dr.	83,034	41
> 600 Vehicles Per Square Mile	2 Dr.	60,449	29
	4 Dr.	57,104	28
Total	2 Dr.	205,924	100
	4 Dr.	204,454	100

NOTES:

- Results are based on the loss experience of the following 1978-1979 two- and four-door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

Table 6
Collision Coverages
Mix of Exposure by Vehicle Density and Body Style
1978-1980 Models

Vehicle Density	Body Style	Exposure (Insured Vehicle Years)	Percentage of Exposure
0-50 Vehicles Per Square Mile	2 Dr.	180,108	34
	4 Dr.	187,207	36
51-600 Vehicles Per Square Mile	2 Dr.	204,734	38
	4 Dr.	195,613	38
> 600 Vehicles Per Square Mile	2 Dr.	148,534	28
	4 Dr.	137,856	26
Total	2 Dr.	533,376	100
	4 Dr.	520,676	100

NOTES:

- Results are based on the loss experience of the following 1978-1980 two- and four- door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

Table 7
Personal Injury Protection Coverages
Claim Frequency Results by Vehicle Density and Body Style
1978-1979 Models

Vehicle Density	Body Style	Claim Frequency by Size of Claim (per 1000 Insured Vehicle Years)			
		All	> $250	> $500	> $1000
0-50 Vehicles Per Square Mile	2 Dr.	19.6	7.8	4.8	2.9
	4 Dr.	16.9	6.6	4.1	2.6
51-600 Vehicles Per Square Mile	2 Dr.	19.9	7.7	4.6	2.7
	4 Dr.	18.6	7.3	4.7	2.8
>600 Vehicles Per Square Mile	2 Dr.	22.6	9.4	6.1	3.7
	4 Dr.	20.7	8.6	5.5	3.1

NOTES:

- Minimum exposure thresholds for reporting:

All claims	5,000 vehicle years
Claims >$250	10,000 vehicle years
Claims >$500	15,000 vehicle years
Claims >$1000	25,000 vehicle years

- Results are based on the loss experience of the following 1978-1979 two- and four-door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

- All results are standardized, see Appendix C for details.

Figure 4
Personal Injury Protection Coverages
Claim Frequency Results by Vehicle Density and Body Style
1978-1979 Models

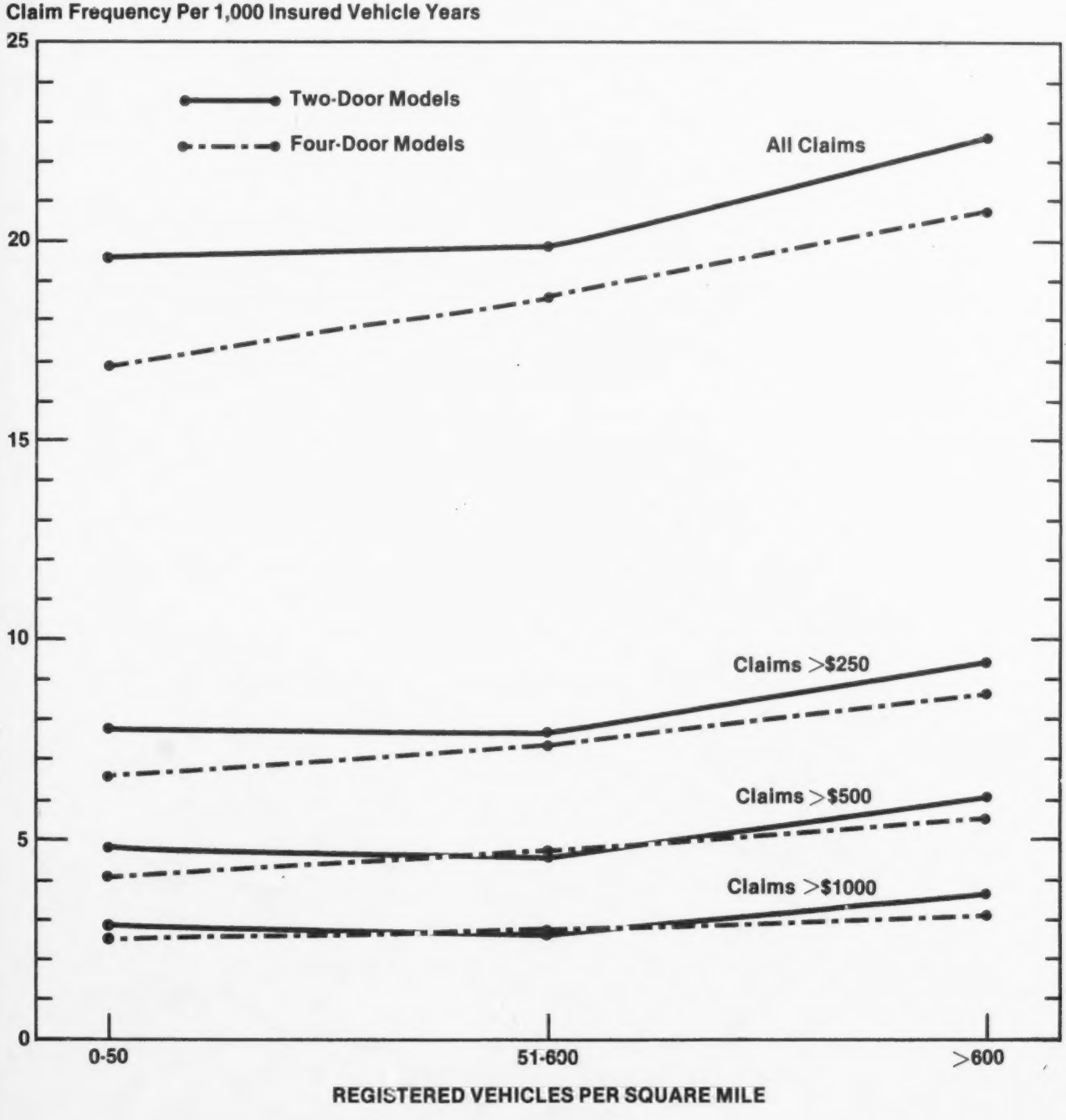


Table 8
Collision Coverages
Loss Results by Vehicle Density and Body Style
1978-1980 Models

Vehicle Density	Body Style	Claim Frequency Per 100 Insured Vehicle Years	Average Loss Payment Per Claim	Average Loss Payment Per Insured Vehicle Year
0-50 Vehicles Per Square Mile	2 Dr.	8.9	$1070	$98
	4 Dr.	7.9	991	81
51-600 Vehicles Per Square Mile	2 Dr.	9.3	1007	95
	4 Dr.	8.5	967	83
>600 Vehicles Per Square Mile	2 Dr.	11.0	973	108
	4 Dr.	10.1	918	94

NOTES:

- Results are based on the loss experience of the following 1978-1980 two- and four-door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.
- All results are standardized; see Appendix C for details.

Figure 5
Collision Coverages
Claim Frequency Results by Vehicle Density and Body Style
1978-1980 Models

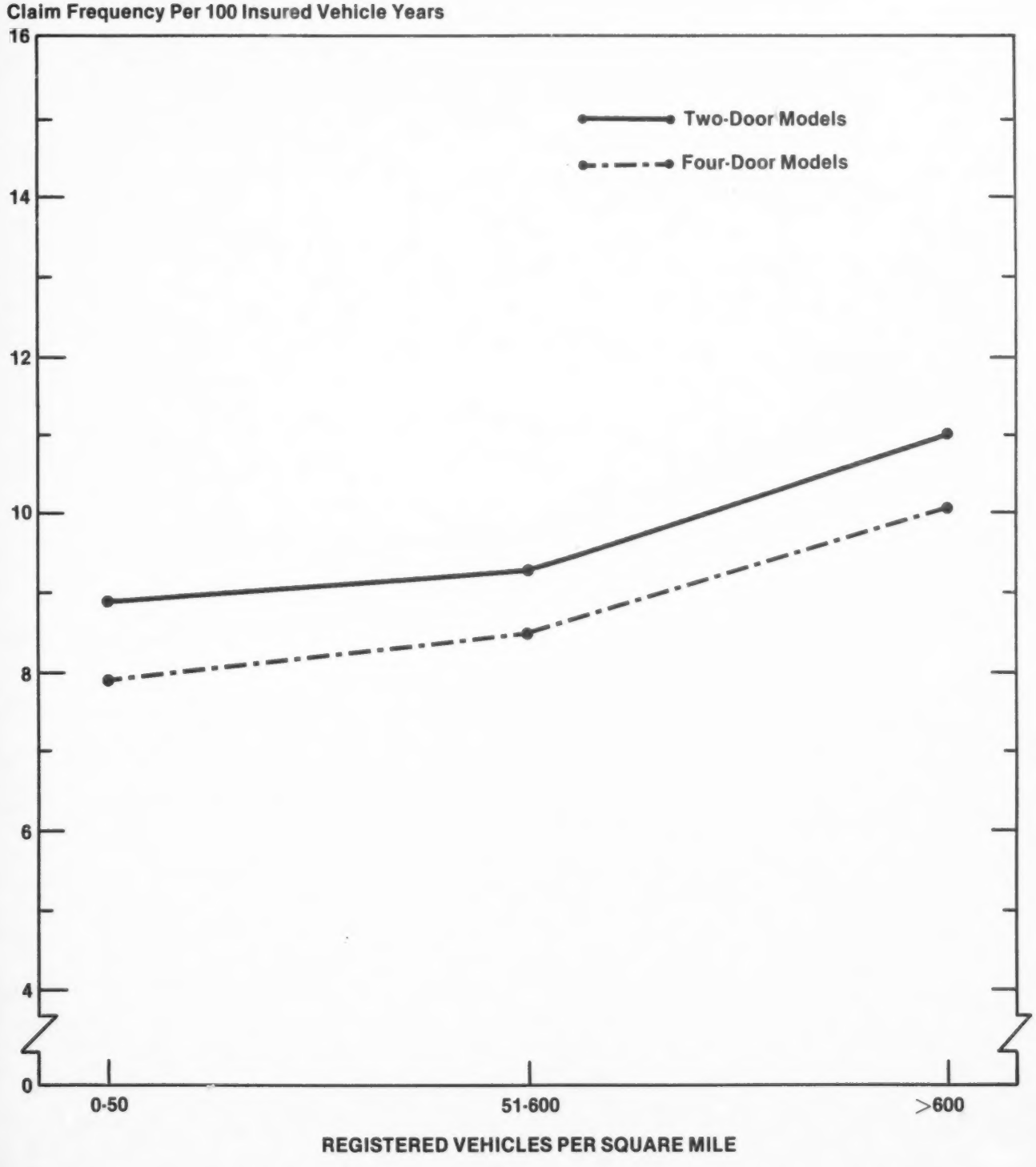


Figure 6
Collision Coverages
Average Loss Payment Per Claim by Vehicle Density and Body Style
1978-1980 Models

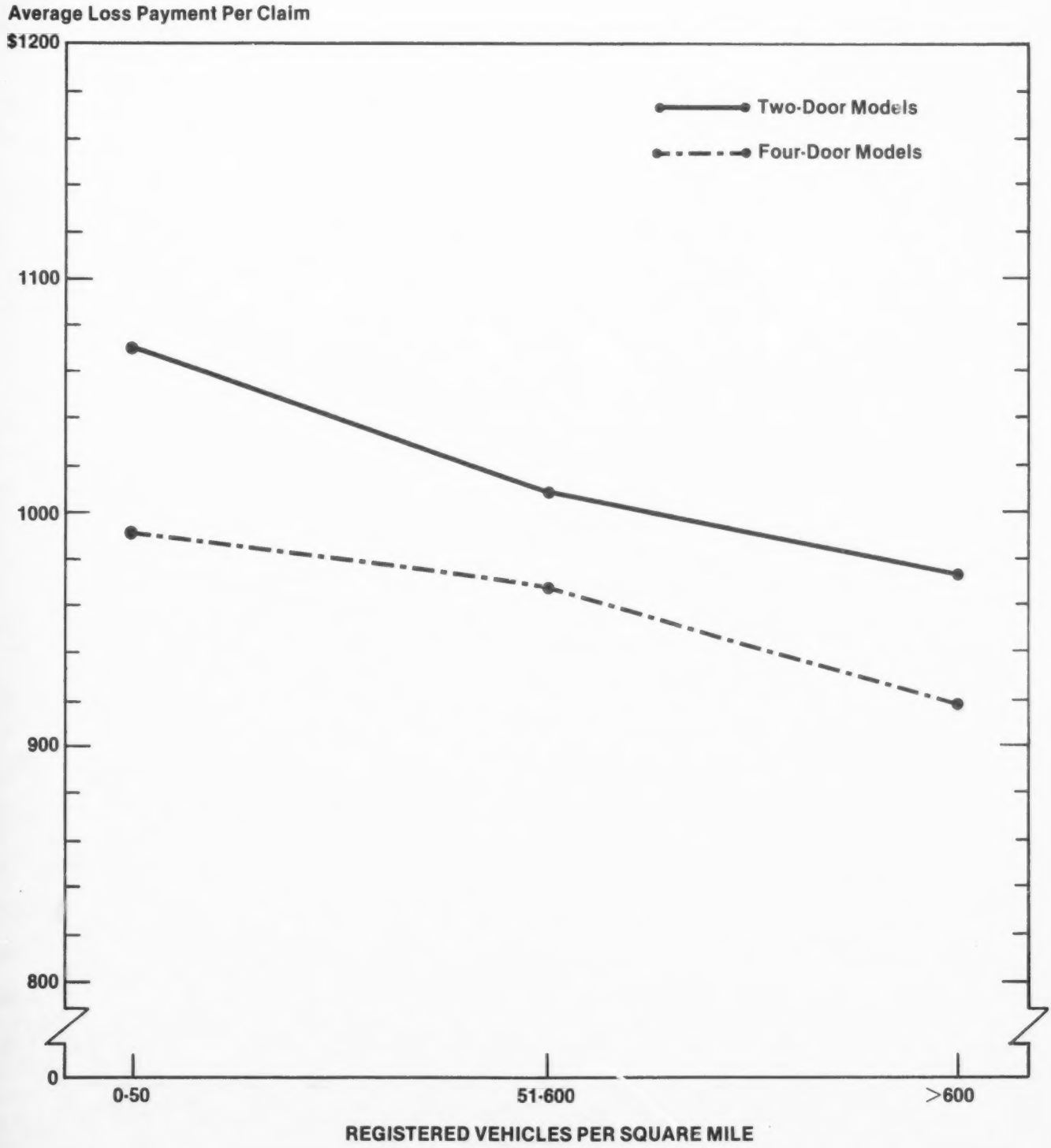
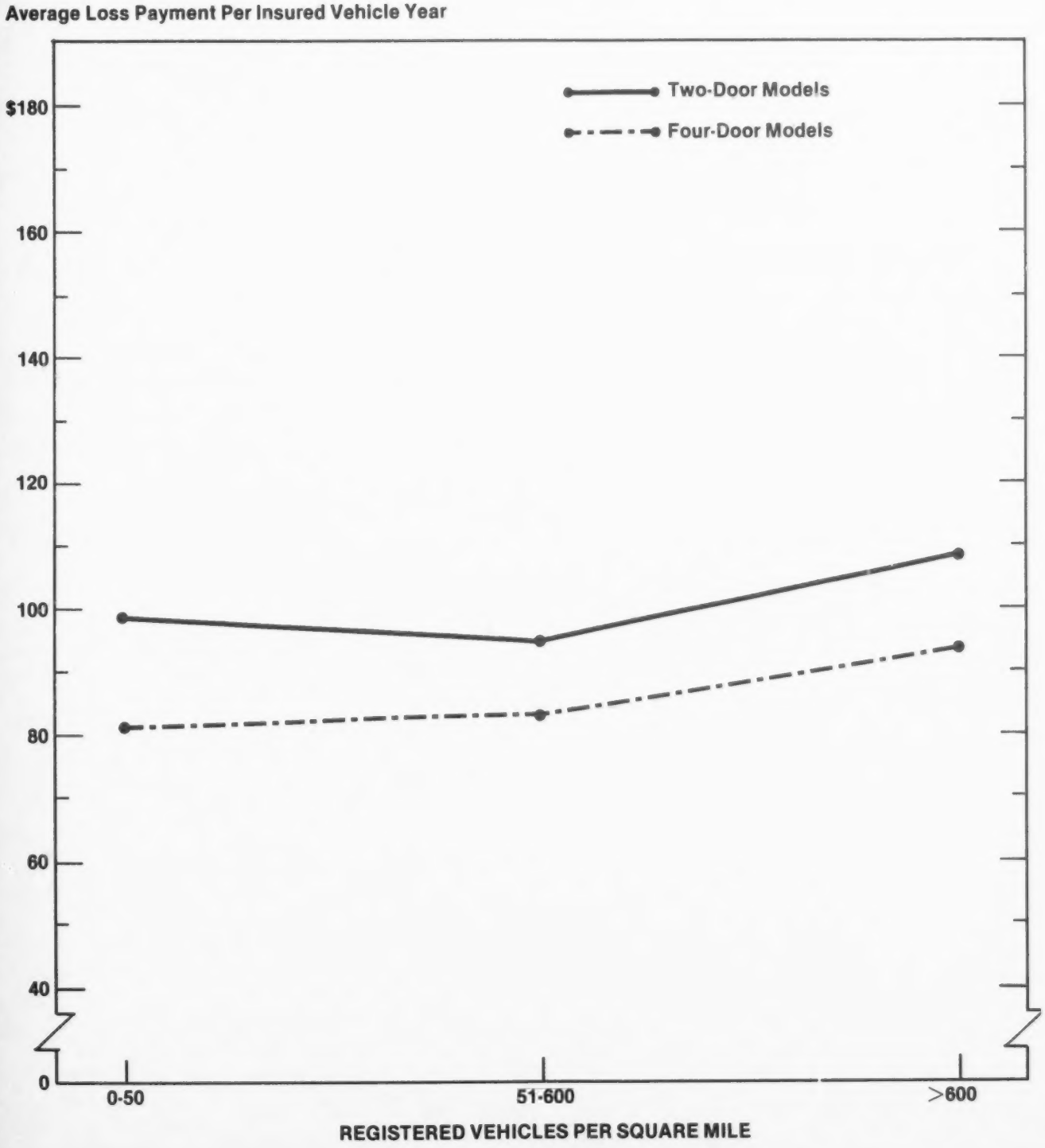


Figure 7
Collision Coverages
Average Loss Payment Per Insured Vehicle Year by Vehicle Density and Body Style
1978-1980 Models



The preceding results by vehicle density, especially the collision coverage results, show that vehicle density differences are not contributing to the differences in loss experience for two- and four-door models.

Vehicle Use

The use of a vehicle can also influence its loss experience. Vehicles used primarily for work or business incur more frequent claims than vehicles operated for pleasure. Thus, if the distribution of exposure between the different use categories varies among individual vehicle series or body style groups, loss results could be affected.

Tables 9 and 10 present the distribution of exposure for two vehicle use groups – pleasure or farm and work or business – for injury and collision coverages. Four-door models had somewhat more of their exposure in the farm or pleasure use category, whereas the distribution of exposure for two-door models was almost equally divided between the use groups.

Table 11 and Figure 8 show the injury loss experience results for the two vehicle use categories by body style. Vehicles insured for business or work use had slightly higher injury claim frequency results in nearly every claim size category than vehicles insured for pleasure or farm use. In each use group and for virtually all of the claim size categories, the two-door models had higher claim frequency results than the four-door models.

Table 12 and Figures 9 through 11 show the collision coverage loss experience results by vehicle use and body style. Vehicles insured for business or work use had slightly higher results, with the exception of average payments per claim for two-door models, than vehicles insured for pleasure or farm use. For each measure of collision coverage loss experience – claim frequency, average payment per claim, and average loss payment per insured vehicle year – two-door models had worse results than four-door models.

These body style differences were also consistent for the four two-door and four-door models whose individual loss experience is summarized in Appendices A4 and A5. Nearly every measure of injury and collision loss experience was higher for the two-door models than for their four-door counterparts.

As with the earlier results by operator age group and vehicle density, the results by vehicle use category show that vehicle use differences are not contributing to the differences in loss experience for two- and four-door models.

Operator Age Group, Vehicle Density, and Vehicle Use

The previous sections have shown that two-door models consistently had higher collision loss results than four-door models in nearly every driver class, vehicle density, and vehicle use group. Body style differences in injury loss experience, however, were not as pronounced. Although two-door models tended to have higher overall injury loss results as well as higher results for claims in excess of $250 than four-door models, these differences were not consistent for the larger claim size categories.

Differences in loss experience by body style were also apparent when the effects of driver age, vehicle density, and vehicle use were examined in combination. Table 13 summarizes the overall injury loss experience by operator age group, vehicle density, and vehicle use by body style. Results are presented only for operator age group 25-64, since the other operator age groups had insufficient exposure to meet the reporting threshold of 5,000 insured vehicle years. Two-door models had higher loss results than four-door models for nearly every claim size. Only among those drivers aged 25-64, whose vehicles were garaged in areas of greater than 600 vehicles per square mile and were insured primarily for work or business use, did four-door models have higher injury loss results.

(cont'd on page 28)

Table 9
Personal Injury Protection Coverages
Mix of Exposure by Vehicle Use and Body Style
1978-1979 Models

Vehicle Use	Body Style	Exposure (Insured Vehicle Years)	Percentage of Exposure
Farm or Pleasure Use	2 Dr.	101,660	49
	4 Dr.	113,660	56
Work or Business Use	2 Dr.	104,264	51
	4 Dr.	90,794	44
Total	2 Dr.	205,924	100
	4 Dr.	204,454	100

NOTES:

- Results are based on the loss experience of the following 1978-1979 two- and four-door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

Table 10
Collision Coverages
Mix of Exposure by Vehicle Use and Body Style
1978-1980 Models

Vehicle Use	Body Style	Exposure (Insured Vehicle Years)	Percentage of Exposure
Farm or Pleasure Use	2 Dr.	269,779	51
	4 Dr.	291,899	56
Work or Business Use	2 Dr.	263,597	49
	4 Dr.	228,777	44
Total	2 Dr.	533,376	100
	4 Dr.	520,676	100

NOTES:

- Results are based on the loss experience of the following 1978-1980 two- and four- door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

Table 11
Personal Injury Protection Injury Coverages
Claim Frequency Results by Vehicle Use and Body Style
1978-1979 Models

Vehicle Use	Body Style	Claim Frequency by Size of Claim (per 1000 Insured Vehicle Years)			
		All	> $250	> $500	> $1000
Farm or Pleasure Use	2 Dr.	20.2	8.1	4.9	3.1
	4 Dr.	17.6	6.9	4.5	2.7
Work or Business Use	2 Dr.	21.1	8.3	5.2	3.0
	4 Dr.	19.8	8.0	5.2	3.1

NOTES:

- Minimum exposure thresholds for reporting:

All claims	5,000 vehicle years
Claims >$250	10,000 vehicle years
Claims >$500	15,000 vehicle years
Claims >$1000	25,000 vehicle years

- Results are based on the loss experience of the following 1978-1979 two- and four-door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.

- All results are standardized, see Appendix C for details.

Figure 8
Personal Injury Protection Coverages
Claim Frequency Results by Vehicle Use and Body Style
1978-1979 Models

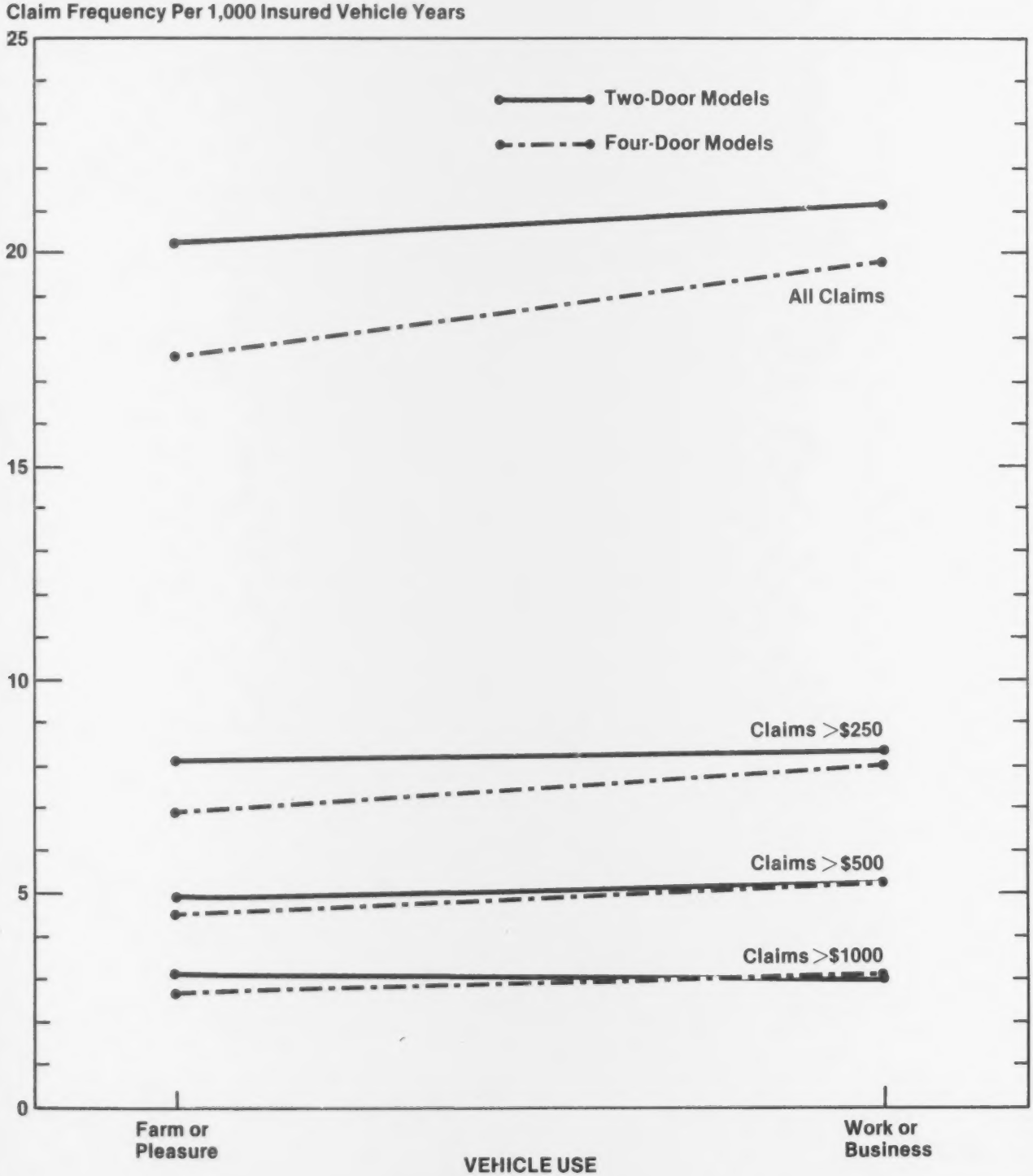


Table 12
Collision Coverages
Loss Results by Vehicle Use and Body Style
1978-1980 Models

Vehicle Use	Body Style	Claim Frequency Per 100 Insured Vehicle Years	Average Loss Payment Per Claim	Average Loss Payment Per Insured Vehicle Year
Farm or Pleasure Use	2 Dr.	9.6	$1017	$ 99
	4 Dr.	8.6	951	83
Work or Business Use	2 Dr.	9.7	1016	101
	4 Dr.	8.9	970	88

NOTES:

- Results are based on the loss experience of the following 1978-1980 two- and four-door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.
- All results are standardized; see Appendix C for details.

Figure 9
Collision Coverages
Claim Frequency Results by Vehicle Use and Body Style
1978-1980 Models

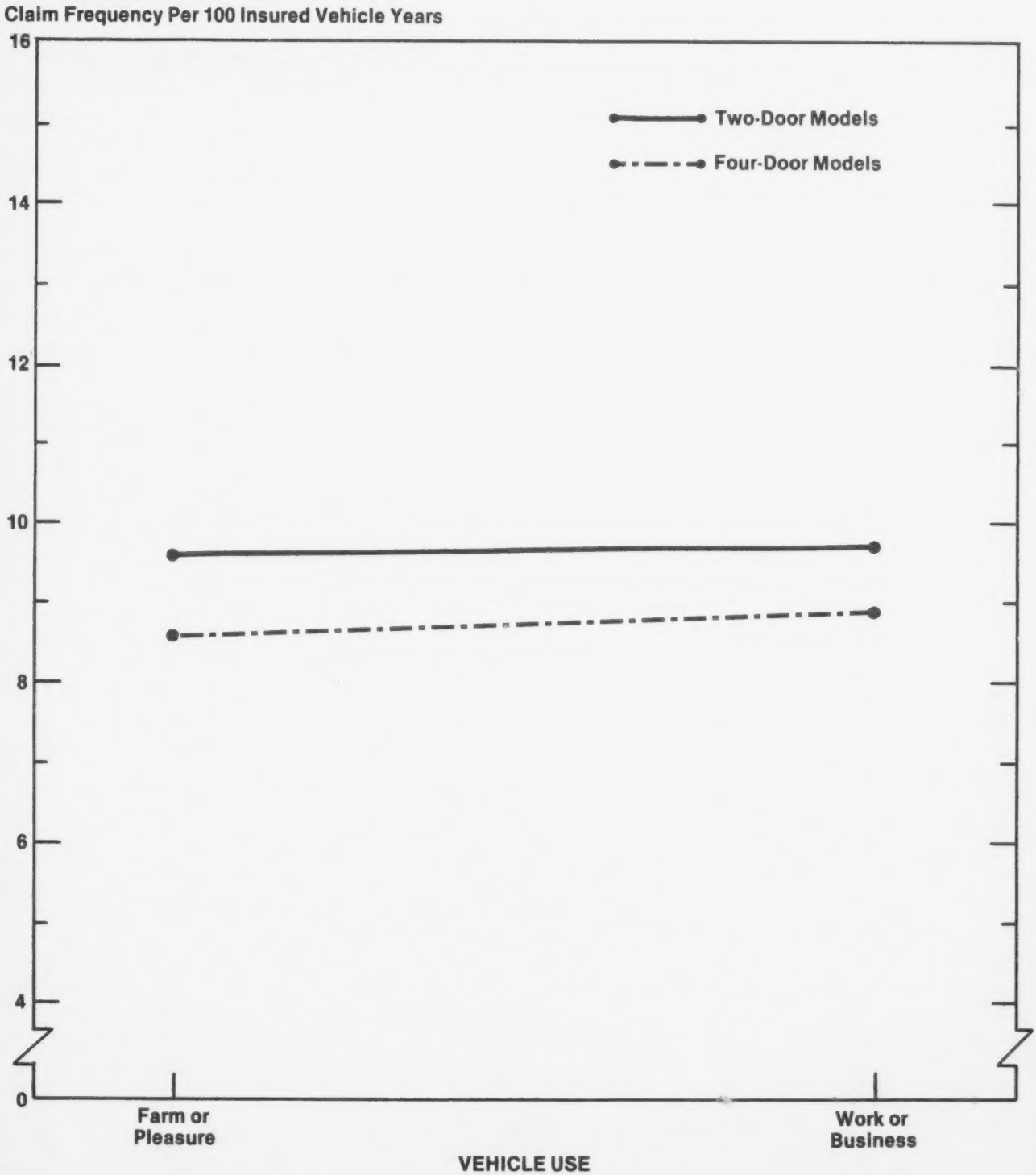


Figure 10
Collision Coverages
Average Loss Payment Per Claim by Vehicle Use and Body Style
1978-1980 Models

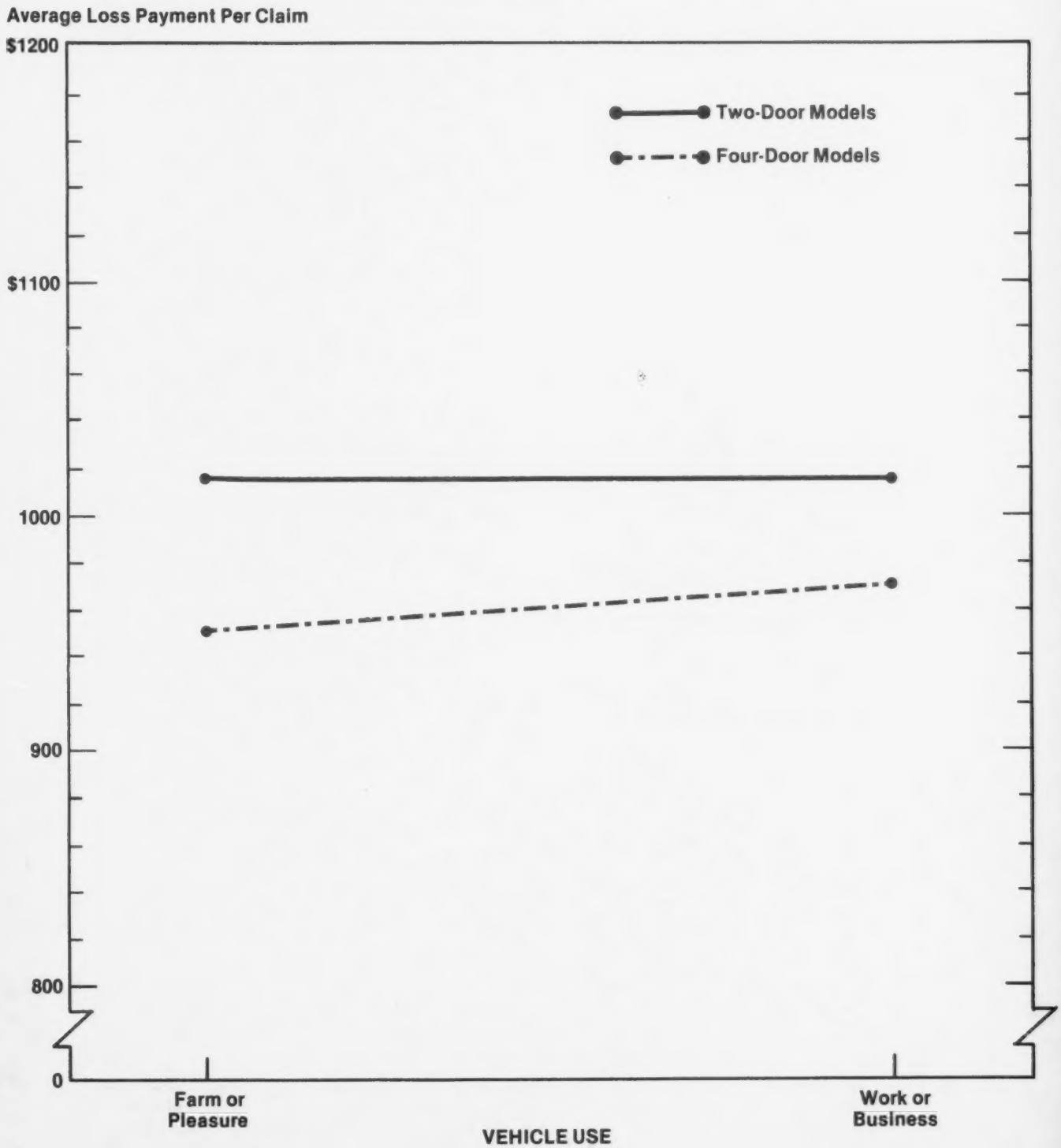


Figure 11
Collision Coverages
Average Loss Payment Per Insured Vehicle Year by Vehicle Use and Body Style
1978-1980 Models

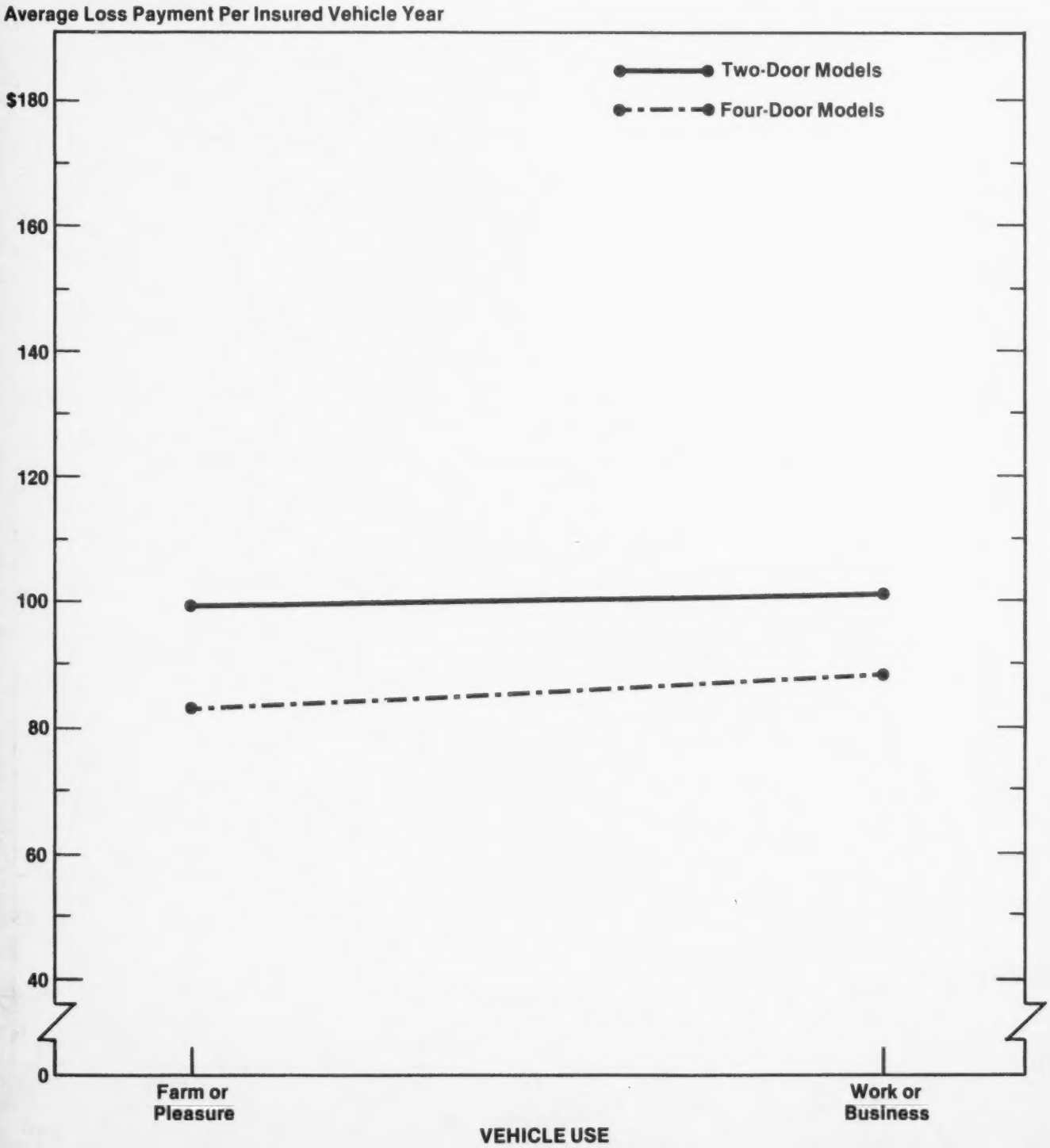


Table 13
Personal Injury Protection Coverages
Claim Frequency Results by Operator Age Group, Vehicle Density, Vehicle Use, and Body Style
1978-1979 Models

	Operator Age Group	Vehicle Density	Vehicle Use	Claim Frequency by Size of Claim (Per 1,000 Insured Vehicle Years)							
				All		>$250		>$500		>$1,000	
				2 Dr.	4 Dr.	2 Dr.	4 Dr.	2 Dr.	4 Dr.	2 Dr.	4 Dr.
Youthful Operator	17-20										
	21-24										
	All Other Youthful										
No Youthful Operator	25-64	0-50	Farm	18.0	15.2	6.8	6.2	3.9	3.8		
		51-600	or	17.2	15.5	7.0	6.1	4.0	4.0	2.6	2.6
		>600	Pleasure	21.6	17.5	9.1	6.8	6.3	4.0		
		0-50	Work	18.4	16.2	7.8	6.5	4.6	4.1		
		51-600	or	18.7	17.6	7.6	6.6	4.7	4.4	2.7	2.7
		>600	Business	20.1	20.7	8.1	8.8	5.1	5.8		
	≥65										

NOTES:

- Minimum exposure thresholds for reporting:

All claims	5,000 vehicle years
Claims >$250	10,000 vehicle years
Claims >$500	15,000 vehicle years
Claims >$1,000	25,000 vehicle years

- Results are based on the loss experience of the following 1978-1979 two- and four-door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.
- All results are standardized; see Appendix C for details.

Table 14 shows the collision loss experience results when the effects of the three non-vehicle factors were combined. In virtually every case, two-door models had higher claim frequencies and average loss payments per insured vehicle year than four-door models. No consistent pattern was apparent for the average payments per claim.

Table 15 presents injury loss results by vehicle density and vehicle use standardized by age groups. With the exception of vehicles garaged in areas of more than 600 registered vehicles per square mile that were insured primarily for work or business uses, two-door models had higher injury loss results than four-door models for each vehicle density and vehicle use group.

Table 16 illustrates similar results for collision coverages. In this case body style differences in collision coverage results were even more pronounced when the effects of operator age group were removed. In each instance, for every measure of collision coverage experience, two-door models had worse loss results than four-door models.

Table 14
Collision Coverages
Loss Results by Operator Age Group, Vehicle Density, Vehicle Use, and Body Style
1978-1980 Models

	Operator Age Group	Vehicle Density	Vehicle Use	Claim Frequency Per 100 Insured Vehicle Years		Average Loss Payment Per Claim		Average Loss Payment Per Insured Vehicle Year	
				2 Dr.	4 Dr.	2 Dr.	4 Dr.	2 Dr.	4 Dr.
Youthful Operator	17-20	0-50	Farm	16.1	12.6	$1205	$1187	$194	$150
		51-600	or	15.8	12.7	1105	1117	175	142
		>600	Pleasure	17.0	14.4	1134	1039	193	150
		0-50	Work	16.3	14.1	1276	1093	208	154
		51-600	or	16.2	14.0	1113	1068	180	150
		>600	Business	17.6	15.0	1115	1022	196	153
	21-24	0-50	Farm	12.3	11.6	1100	1112	135	129
		51-600	or	12.3	10.4	1061	962	131	100
		>600	Pleasure	13.7	12.7	979	1090	134	138
		0-50	Work	10.4	9.7	1105	1141	115	111
		51-600	or	11.6	10.8	1058	1100	123	119
		>600	Business	13.6	12.1	996	1057	135	128
	All Other Youthful	0-50	Farm	12.3	10.5	1260	1143	155	120
		51-600	or						
		>600	Pleasure						
		0-50	Work						
		51-600	or						
		>600	Business						
No Youthful Operator	25-64	0-50	Farm	7.7	6.9	1036	931	80	64
		51-600	or	7.9	7.2	979	931	77	67
		>600	Pleasure	9.8	9.0	962	874	94	79
		0-50	Work	7.7	7.0	1057	977	81	68
		51-600	or	8.3	7.8	990	937	82	73
		>600	Business	9.7	9.5	934	898	91	85
	≥65	0-50	Farm	6.4	6.5	864	790	55	51
		51-600	or	7.5	6.2	868	957	65	59
		>600	Pleasure	7.9	7.8	1047	790	83	62
		0-50	Work						
		51-600	or	8.7	6.4	1046	933	91	60
		>600	Business	11.9	10.1	862	853	103	86

NOTES:

- Results based on less than 1,000 insured vehicle years are not reported.
- Results are based on the loss experience of the following 1978-1980 two- and four-door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.
- All results are standardized; see Appendix C for details.

Table 15
Personal Injury Protection Coverages
Claim Frequency Results by Vehicle Density, Vehicle Use, and Body Style
1978-1979 Models

Vehicle Density	Vehicle Use	Claim Frequency by Size of Claim (Per 1,000 Insured Vehicle Years)							
		All		>$250		>$500		>$1,000	
		2 Dr.	4 Dr.	2 Dr.	4 Dr.	2 Dr.	4 Dr.	2 Dr.	4 Dr.
0-50	Farm	19.1	16.3	7.4	6.4	4.3	4.2	2.7	2.9
51-600	or	19.4	17.5	7.7	6.8	4.5	4.1	2.8	2.3
>600	Pleasure	22.8	19.1	9.3	7.7	6.3	5.1	3.9	2.8
0-50	Work	20.5	17.6	8.3	6.8	5.3	4.0	3.2	2.4
51-600	or	20.3	19.7	7.8	7.4	4.7	5.1	2.6	3.7
>600	Business	22.5	22.6	9.5	9.8	5.9	6.3	3.4	3.7

NOTES:

- Minimum exposure thresholds for reporting:

All claims	5,000 vehicle years
Claims >$250	10,000 vehicle years
Claims >$500	15,000 vehicle years
Claims >$1000	25,000 vehicle years

- Results are based on the loss experience of the following 1978-1979 two-and four-door models: Plymouth Horizon (1979 model year only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.
- All results are standardized; see Appendix C for details.

Table 16
Collision Coverages
Loss Results by Vehicle Density, Vehicle Use, and Body Style
1978-1980 Models

Vehicle Density	Vehicle Use	Claim Frequency Per 100 Insured Vehicle Years		Average Loss Payment Per Claim		Average Loss Payment Per Insured Vehicle Year	
		2 Dr.	4 Dr.	2 Dr.	4 Dr.	2 Dr.	4 Dr.
0-50	Farm	9.1	8.0	$1062	$ 977	$ 97	$ 78
51-600	or	9.2	8.1	1003	964	93	78
>600	Pleasure	10.9	10.0	986	910	107	91
0-50	Work	8.9	8.0	1079	1017	96	81
51-600	or	9.5	8.8	1013	967	96	85
>600	Business	11.0	10.3	961	931	106	96

NOTES:

- Results are based on the loss experience of the following 1978-1980 two- and four-door models: Plymouth Horizon (1979-1980 model years only), Chevrolet Chevette, Chevrolet Malibu, and Ford Fairmont.
- All results are standardized; see Appendix C for details.

Appendix A

Loss Results by Make and Series

Appendix A1
Collision Coverages
Detailed Loss Results by Operator Age Group
1978-1980 Models

	Operator Age Group	Model	Body Style	Exposure (Insured Vehicle Years)	Claim Frequency Per 100 Insured Vehicle Years	Average Loss Payment Per Claim	Average Loss Payment Per Insured Vehicle Year
Youthful Operator	17-20	Plym. Horizon	2 Dr.	2,812	19.8	$1458	$288
		Plym. Horizon	4 Dr.	3,256	13.4	1328	178
		Ford Fairmont	2 Dr.	14,006	16.5	1173	194
		Ford Fairmont	4 Dr.	5,993	12.8	1055	135
		Chev. Chevette	2 Dr.	21,516	16.1	1120	180
		Chev. Chevette	4 Dr.	19,546	14.6	1110	162
		Chev. Malibu	2 Dr.	7,467	15.5	1114	173
		Chev. Malibu	4 Dr.	6,050	13.0	1046	136
	21-24	Plym. Horizon	2 Dr.	2,847	14.1	1375	194
		Plym. Horizon	4 Dr.	3,832	11.5	1171	134
		Ford Fairmont	2 Dr.	14,093	12.5	1074	134
		Ford Fairmont	4 Dr.	3,626	11.4	1101	125
		Chev. Chevette	2 Dr.	21,773	11.8	1008	119
		Chev. Chevette	4 Dr.	14,945	11.2	1063	119
		Chev. Malibu	2 Dr.	9,442	11.5	1001	115
		Chev. Malibu	4 Dr.	3,271	10.2	1037	106
	All Other Youthful	Plym. Horizon	2 Dr.				
		Plym. Horizon	4 Dr.				
		Ford Fairmont	2 Dr.				
		Ford Fairmont	4 Dr.				
		Chev. Chevette	2 Dr.	3,136	10.9	1065	116
		Chev. Chevette	4 Dr.	2,299	10.8	1068	115
		Chev. Malibu	2 Dr.				
		Chev. Malibu	4 Dr.				

(Appendix A1 continued on next page)

Appendix A1 (continued)
Collision Coverages
Detailed Loss Results by Operator Age Group
1978-1980 Models

	Operator Age Group	Model	Body Style	Exposure (Insured Vehicle Years)	Claim Frequency Per 100 Insured Vehicle Years	Average Loss Payment Per Claim	Average Loss Payment Per Insured Vehicle Year
No Youthful Operator	25-64	Plym. Horizon	2 Dr.	22,005	10.2	$1180	$120
		Plym. Horizon	4 Dr.	42,294	7.5	1028	77
		Ford Fairmont	2 Dr.	151,551	8.6	990	85
		Ford Fairmont	4 Dr.	91,147	8.1	934	75
		Chev. Chevette	2 Dr.	126,687	8.1	997	80
		Chev. Chevette	4 Dr.	181,748	7.5	926	69
		Chev. Malibu	2 Dr.	104,188	8.2	926	76
		Chev. Malibu	4 Dr.	101,224	7.9	877	70
	≥65	Plym. Horizon	2 Dr.				
		Plym. Horizon	4 Dr.				
		Ford Fairmont	2 Dr.	11,070	7.9	922	73
		Ford Fairmont	4 Dr.	13,365	7.3	913	67
		Chev. Chevette	2 Dr.	3,688	6.6	903	60
		Chev. Chevette	4 Dr.	7,283	6.3	833	53
		Chev. Malibu	2 Dr.	9,117	7.6	833	64
		Chev. Malibu	4 Dr.	17,594	7.3	856	62

NOTES:

- Results based on less than 1,000 insured vehicle years are not reported.
- All results are standardized; see Appendix C for details.

Appendix A2
Personal Injury Protection Coverages
Detailed Claim Frequency Results by Vehicle Density
1978-1979 Models

Vehicle Density	Model	Body Style	Exposure (Insured Vehicle Years)	Claim Frequency by Size of Claim (Per 1,000 Insured Vehicle Years)			
				All	>$250	>$500	>$1,000
0-50 Vehicles per Square Mile	Plym. Horizon	2 Dr.					
	Plym. Horizon	4 Dr.					
	Ford Fairmont	2 Dr.	23,825	19.9	8.3	5.3	
	Ford Fairmont	4 Dr.	15,636	18.6	7.8	5.0	
	Chev. Chevette	2 Dr.	19,049	21.2	8.2	4.3	
	Chev. Chevette	4 Dr.	27,925	17.8	7.0	4.4	
	Chev. Malibu	2 Dr.	14,665	15.0	5.7		
	Chev. Malibu	4 Dr.	15,173	13.8	4.9		
51-600 Vehicles per Square Mile	Plym. Horizon	2 Dr.	5,066	19.2			
	Plym. Horizon	4 Dr.	9,424	15.4			
	Ford Fairmont	2 Dr.	30,590	21.6	8.4	5.1	
	Ford Fairmont	4 Dr.	17,297	18.4	8.4	5.0	
	Chev. Chevette	2 Dr.	28,821	20.4	8.2	4.9	2.9
	Chev. Chevette	4 Dr.	35,817	20.9	7.5	5.0	3.0
	Chev. Malibu	2 Dr.	20,585	17.3	6.8	4.0	
	Chev. Malibu	4 Dr.	20,495	16.7	6.1	4.2	
>600 Vehicles per Square Mile	Plym. Horizon	2 Dr.					
	Plym. Horizon	4 Dr.					
	Ford Fairmont	2 Dr.	20,731	23.5	10.2		
	Ford Fairmont	4 Dr.	12,180	21.5	9.3		
	Chev. Chevette	2 Dr.	18,000	22.9	10.4	6.7	
	Chev. Chevette	4 Dr.	21,417	23.7	9.1	5.7	
	Chev. Malibu	2 Dr.	18,772	21.6	7.6	4.7	
	Chev. Malibu	4 Dr.	17,953	15.3	6.8	4.3	

NOTES:

- Minimum exposure thresholds for reporting:

All claims	5,000 vehicle years	Claims >$500	15,000 vehicle years
Claims >$250	10,000 vehicle years	Claims >$1,000	25,000 vehicle years

- All results are standardized; see Appendix C for details.

Appendix A3
Collision Coverages
Detailed Loss Results by Vehicle Density
1978-1980 Models

Vehicle Density	Model	Body Style	Exposure (Insured Vehicle Years)	Claim Frequency per 100 Insured Vehicle Years	Average Loss Payment Per Claim	Average Loss Payment Per Insured Vehicle Year
0-50 Vehicles per Square Mile	Plym. Horizon	2 Dr.	9,511	11.1	$1355	$154
	Plym. Horizon	4 Dr.	16,312	8.0	1075	88
	Ford Fairmont	2 Dr.	70,151	9.2	1070	100
	Ford Fairmont	4 Dr.	44,625	8.2	1008	84
	Chev. Chevette	2 Dr.	58,674	8.6	1065	92
	Chev. Chevette	4 Dr.	83,299	7.9	994	80
	Chev. Malibu	2 Dr.	41,772	8.4	989	85
	Chev. Malibu	4 Dr.	42,971	7.7	942	74
51-600 Vehicles per Square Mile	Plym. Horizon	2 Dr.	12,770	11.8	1207	145
	Plym. Horizon	4 Dr.	21,042	8.1	1135	94
	Ford Fairmont	2 Dr.	71,843	9.6	1010	98
	Ford Fairmont	4 Dr.	40,434	8.7	966	85
	Chev. Chevette	2 Dr.	70,863	8.8	993	88
	Chev. Chevette	4 Dr.	87,513	8.3	962	81
	Chev. Malibu	2 Dr.	49,258	8.9	964	87
	Chev. Malibu	4 Dr.	46,624	8.5	927	79
>600 Vehicles per Square Mile	Plym. Horizon	2 Dr.	7,615	11.8	1126	136
	Plym. Horizon	4 Dr.	13,329	9.8	1043	104
	Ford Fairmont	2 Dr.	51,865	11.2	969	110
	Ford Fairmont	4 Dr.	30,044	10.2	932	96
	Chev. Chevette	2 Dr.	47,262	10.7	979	106
	Chev. Chevette	4 Dr.	55,008	10.1	918	94
	Chev. Malibu	2 Dr.	41,792	10.7	920	99
	Chev. Malibu	4 Dr.	39,475	10.1	863	88

NOTES:

- All results are standardized; see Appendix C for details.

Appendix A4
Personal Injury Protection Coverages
Detailed Claim Frequency by Vehicle Use
1978-1979 Models

Vehicle Use	Model	Body Style	Exposure (Insured Vehicle Years)	Claim Frequency by Size of Claim (Per 1,000 Insured Vehicle Years)			
				All	>$250	>$500	>$1,000
Farm or Pleasure	Plym. Horizon	2 Dr.					
	Plym. Horizon	4 Dr.					
	Ford Fairmont	2 Dr.	38,268	20.8	8.7	5.6	3.3
	Ford Fairmont	4 Dr.	26,701	18.3	8.0	5.3	2.9
	Chev. Chevette	2 Dr.	29,740	21.0	8.5	4.8	3.0
	Chev. Chevette	4 Dr.	43,275	19.1	7.0	4.5	2.8
	Chev. Malibu	2 Dr.	28,720	17.5	6.7	4.5	2.9
	Chev. Malibu	4 Dr.	33,329	14.5	5.3	3.3	2.4
Work or Business	Plym. Horizon	2 Dr.	6,154	20.4			
	Plym. Horizon	4 Dr.	10,206	17.2			
	Ford Fairmont	2 Dr.	36,878	22.6	9.1	5.8	
	Ford Fairmont	4 Dr.	18,412	21.2	9.2	5.8	
	Chev. Chevette	2 Dr.	36,130	21.5	8.8	5.4	3.0
	Chev. Chevette	4 Dr.	41,884	22.0	8.4	5.4	3.2
	Chev. Malibu	2 Dr.	25,102	18.9	6.9	4.0	
	Chev. Malibu	4 Dr.	20,292	15.9	6.8	4.4	

NOTES:

- Minimum exposure thresholds for reporting:

All claims	5,000 vehicle years
Claims >$250	10,000 vehicle years
Claims >$500	15,000 vehicle years
Claims >$1,000	25,000 vehicle years

- All results are standardized; see Appendix C for details.

Appendix A5
Collision Coverages
Detailed Loss Results by Vehicle Use
1978-1980 Models

Vehicle Use	Model	Body Style	Exposure (Insured Vehicle Years)	Claim Frequency per 100 Insured Vehicle Years	Average Loss Payment Per Claim	Average Loss Payment Per Insured Vehicle Year
Farm or Pleasure	Plym. Horizon	2 Dr.	13,742	11.9	$1303	$159
	Plym. Horizon	4 Dr.	25,842	8.3	1083	92
	Ford Fairmont	2 Dr.	101,403	9.6	1000	98
	Ford Fairmont	4 Dr.	68,858	8.7	961	85
	Chev. Chevette	2 Dr.	82,512	9.4	1010	95
	Chev. Chevette	4 Dr.	117,063	8.5	954	83
	Chev. Malibu	2 Dr.	72,121	9.1	960	89
	Chev. Malibu	4 Dr.	80,136	8.5	895	77
Work or Business	Plym. Horizon	2 Dr.	16,153	11.5	1162	135
	Plym. Horizon	4 Dr.	24,841	8.7	1093	97
	Ford Fairmont	2 Dr.	92,457	10.2	1038	107
	Ford Fairmont	4 Dr.	46,245	9.4	979	95
	Chev. Chevette	2 Dr.	94,286	9.2	1007	93
	Chev. Chevette	4 Dr.	108,757	8.6	971	85
	Chev. Malibu	2 Dr.	60,701	9.5	958	93
	Chev. Malibu	4 Dr.	48,934	9.1	919	84

NOTES:

- All results are standardized; see Appendix C for details.

Appendix B

Sources and Nature of Data

Sources and Nature of Data

Policy and claim related coverage data for 1978 model year vehicles in the calendar period September 1977 through September 1980, for 1979 model year vehicles in the period September 1978 through September 1980, and for 1980 model year vehicles in the period September 1979 through September 1980 were used in the preparation of this report. "Assigned risk", fleet policies, and all data from Massachusetts were excluded.

The personal injury protection coverages reported in this study were based on data from the 20 states listed in Table B-1.

Table B-1
Personal Injury Protection (PIP) Coverages
States Included

Colorado	Minnesota
Connecticut	Nevada (through December 1979)
Delaware	New Jersey
Florida	New York
Georgia	North Dakota
Hawaii	Oregon
Kansas	Pennsylvania
Kentucky	South Carolina
Maryland	Texas
Michigan	Utah

The calendar periods reflected in the data used from each company are summarized below:

COMPANY	CALENDAR PERIOD
Aetna	September 1977-September 1980
Allstate	September 1977-September 1980
GEICO	September 1978-August 1980
Kemper	September 1977-September 1980
Liberty	September 1977-July 1980
Nationwide	September 1977-September 1980
Prudential	September 1977-August 1980
State Farm	September 1977-Septeember 1980
Travelers	September 1977-September 1980
USAA	September 1978-September 1980

The number of registered passenger vehicles per square mile was obtained from data on the number of registered passenger vehicles in specific geographic areas obtained from the R.L. Polk Company and the corresponding land areas obtained from the Rand McNally Company.

Insurance Policy Data

Insurance policy data, as distinct from claim data, describe the characteristics of an insured vehicle, including its make and series and the nature of its coverage. Policy data used in this report included the

following basic information:

Vehicle Identification Number (VIN)*
Deductible Amount*
Vehicle Use
Rated Driver Characteristics*
Recorded Garaging Location
Date and Nature of Relevant Changes in Coverages

Insurance Claim Data

Insurance claim data report the characteristics of an insured vehicle for which a claim is made, the initiation of the claim, and/or the corresponding payment. Claim data used in this report included the following basic information:

Vehicle Identification Number (VIN)
Crash Date
Loss Payment Amount

The dollar amounts reported represented collision coverage loss payments made to or on behalf of the policyholder for damage to the insured vehicle.

*See Appendix D for definitions.

Appendix C

Method of Data Analysis

Method of Data Analysis

Insurance Coverages

Results in this report are based on "personal injury protection" (PIP) and collision coverages. PIP coverages are provided in so-called no-fault states. These coverages were selected because they provide medical expense reimbursement to injured occupants of the insured vehicle.

Use of PIP insurance data to identify crashes involving injury has certain limitations because these data cannot provide information on all occupant injuries. This occurs when claims for injury costs are not made under PIP coverages because of the availability of other sources of medical expense reimbursements such as bodily injury liability and/or health insurance coverages. Consequently, PIP claim frequencies do not include all of the crashes involving injury. This limitation should not distort comparisons among different vehicles.

Vehicle Description and Identification

The Vehicle Identification Numbers (VINs) of most new automobiles sold in the United States are individually unique numbers that contain, in coded form, detailed information as to each vehicle's make, model year, series, and other distinguishing characteristics.

The very specific vehicle types for which results are presented in this report were derived from the VINs of the individual automobiles.

Only data with valid VINs were used for this report. Each VIN was decoded into a set of specific characteristics. For the purposes of this report the vehicle characteristics of primary concern were make, model year, series, and body style.

Driver Characteristics

Five age, sex, and marital status classifications are used in this study. The five classes are:

1) All drivers aged 65 or older
2) Drivers aged 25-64 except single males 25-29
3) Drivers aged 17-20 except married females
4) Drivers aged 21-24 except married females
5) Married female drivers aged 17-24 and single male drivers aged 25-29

These classes are derived from insurance policy data giving the demographic characteristics of the rated driver for each vehicle.

Vehicle Density

For the purposes of this report, vehicle density was defined as the number of passenger vehicles, registered in 1974, per square mile for any given garaging location. The garaging locations were defined in one of two ways, depending on the source. One definition was a zip zone – defined as the aggregation of those zip codes with identical first three digits. The areas encompassed by such aggregations of zip codes are always contiguous. The other definition of a garaging location corresponded to insurance state and territory rating territories.

The data for the computation of zip zone densities were derived from zip zone land areas in square miles and the number of registered passenger cars for each zip zone. From these two data sources a computerized table was created permitting the computation of vehicle densities for each zip zone. For example, Manhattan, New York is zip zone 100 with individual zip codes within Manhattan ranging from 10001 through 10045. In 1974 there were 123,826 passenger cars registered in this zip zone, which had a land area of 23 square miles; thus, the resultant density was 5,384 vehicles per square mile. For the companies supplying garaging location information in zip code form, the appropriate vehicle density was assigned to each insured vehicle from this table.

For the companies supplying garaging locations in the form of insurance state and territory codes, a second separate table was constructed, listing each state and territory code and, for each, all of the zip zones either completely or partially within that territory. For example, state 31, territory 18, is Manhattan, New York and the only zip zone that is within that territory, either completely or partially, is zip zone 100. Therefore, the same vehicle density result obtained above was also obtained for this insurance territory. Some insurance territories, however, contain all or part of more than one zip zone. For example, state 31, territory 8, is semi-suburban Buffalo, New York, and zip zone 141 and 142 are within that territory. For such insurance territories, the vehicle density was derived by summing all of the registered vehicles and all of the land areas for the zip zones that were partially or completely within the territory.

Through knowledge of their listed garaging locations and use of the area and registration data described above, the distributions of insured vehicles in the HLDI files by vehicle density were obtained for 1978 through 1980 vehicles. From these distributions, three vehicle density groups were defined, each containing nearly one-third of the total number of insured vehicles.

The three vehicle density groups and examples of zip zones and insurance state and territory descriptions for each are presented in Table C-1.

Table C-1
Examples of Garaging Locations and Associated Vehicle Densities

Vehicle Density Group	—Zip Zones— Zip	Description	Insurance State and Territory Descriptions
0-50 Registered Vehicles per Square Mile	035	Littleton, NH	Warren County, MS
	504	Mason City, IA	Decatur, IL
	338	Lakeland, FL	Bloomington, IN
51-600 Registered Vehicles per Square Mile	173	York, PA	Harris County, TX
	253	Charleston, WV	New Britain, CT
	787	Austin, TX	Bridgeport, CT
>600 Registered Vehicles per Square Mile	551	St. Paul, MN	Syracuse, NY
	086	Trenton, NJ	Norfolk, VA
	112	Brooklyn, NY	Philadelphia, PA

Vehicle Use

Two vehicle use classifications were derived from the insurance coverage data. Vehicles were classified as to whether they were operated primarily for farm or pleasure use or for work or business use.

Exposure

Exposure, in terms of insured vehicle years, was computed for each individual vehicle from the coverage data. For each model, exposure was computed for each of the thirty combinations of driver class, vehicle density, and vehicle use group.

Claim Frequency

Both pending and paid claims for an individual vehicle were first matched with its corresponding coverage data to ensure that the crash had occurred within an appropriate period of injury or collision coverage for that vehicle. In every instance in which multiple claims were made for the same crash – e.g., when more than one occupant of the car incurred medical expenses – the claims were treated as a single injury claim in the calculation of claim frequencies. It should be noted that medical expenses can sometimes be incurred even though the occupants are not injured. This can occur, for example, when precautionary medical examinations are undertaken even though no injuries are apparent, or, in fact, found.

Claims that were settled without payment, as well as those paid for collision losses even though the damage was less than the deductible amount, were excluded from the computations. All remaining claims for each vehicle series, together with the corresponding exposure, were used to compute the claim frequency. For injury coverages the claim frequency is the number of claims per 1,000 insured vehicle years; for collision coverages, it is the number of claims per 100 insured vehicle years.

In addition to the overall claim frequency results, separate claim frequency results were computed for claims in which the medical losses exceeded $250, $500, and $1,000. The latter three results provide indications of the extent to which particular cars are over- or under-involved in crashes resulting in more significant injuries. Claims involving non-medical losses only and claims settled without payments were not used. Thus, the claim frequencies represent the number of crashes per 1,000 insured vehicle years in which one or more injuries occurred resulting in medical expense claim payments under PIP insurance coverages.

For each vehicle series, claim frequencies were computed for each of the thirty possible combinations of driver class, vehicle density, and vehicle use group.

Average Loss Payment

Paid collision claims for each vehicle series were used to compute its average loss payment per claim. They were summed and divided by the number of claims to produce the average loss payment per claim. Claims that were settled without payment were excluded from the computations. In every instance in which multiple claims and/or multiple payments were made for the same crash, they were treated as a single claim and/or a single payment in the calculation of average loss payment.

Average loss payments were obtained for each combination of driver class, vehicle density, and vehicle use group.

Average Loss Payment Per Insured Vehicle Year

The average collision loss payment per insured vehicle year for each vehicle series was obtained by multiplying the claim frequency per 100 insured vehicle years by the average loss payment, and dividing the result by one hundred.

Average loss payments per insured vehicle year were also obtained for each combination of driver class, vehicle density, and vehicle use group.

Standardization

In order to remove any biases in the comparison of results by body style that could arise because of variations in the amount of exposure and related loss experience that each model contributes to the overall body style results, the results were adjusted or standardized to the same mix of model exposure. In this procedure, applied to both claim frequencies and average loss payments, a weighted combination of individual results was used to obtain the body style results. The weights used in the procedure are shown in the tables below.

Injury Coverage Vehicle Standardization Weights

Model	Exposure	% Total Exposure	Weight
Plymouth Horizon	31,647	7.72	.0772
Ford Fairmont	120,259	29.30	.2930
Chevrolet Chevette	151,029	36.80	.3680
Chevrolet Malibu	107,443	26.18	.2618
Total	410,378	100.00	1.0000

Collision Coverage Vehicle Standardization Weights

Model	Exposure	% Total Exposure	Weight
Plymouth Horizon	80,578	7.64	.0764
Ford Fairmont	308,963	29.31	.2931
Chevrolet Chevette	402,618	38.20	.3820
Chevrolet Malibu	261,892	24.85	.2485
Total	1,054,051	100.00	1.0000

As Tables 3 and 4 have shown above, loss experience also varied substantially in relation to operator age. Consequently, the loss results by body style for each vehicle density and vehicle use class were standardized to the same mix of operator age group as well as vehicle exposure. In this way, the results were based on the same mix, or distribution, of exposure for the five operator age groups. The weights used in the standardization procedure are shown in the following tables.

Injury Coverage Operator Age Group Weights

Operator Age Group	Weight
17-20	.0885
21-24	.1045
All other youthful	.0335
25-64	.7547
≥65	.0188
Total	1.0000

Collision Coverage Standardization Weights

Operator Age Group	Weight
17-20	.0892
21-24	.1060
All other youthful	.0308
25-64	.7564
≥65	.0176
Total	1.0000

Since the same weights were used in the calculation of results for each vehicle density and vehicle use class by body style, the effects due to operator age group were present in equal amounts in the standardized results.

This standardization procedure is widely used in vital health statistics*; the basic principle of this procedure is the introduction of a standard distribution of exposure for the different operator age groups.

* For example, see Armitage, P., *Statistical Methods in Medical Research,* Wiley, New York, 1971.

Appendix D

Definitions

Definitions

Average Loss Payment per Claim – The total of all collision loss payments made for the claims for a group of vehicles, divided by the number of claims paid; expressed as dollars per claim.

Average Loss Payment per Insured Vehicle Year – For a group of vehicles, the product of Claim Frequency and Average Loss Payment per Claim, divided by 100; expressed as dollars per insured vehicle year. It should be noted that this definition differs from the commonly used insurance term, pure premium, but yields similar results.

Collision Claim Frequency – The number of claims for a group of vehicles, divided by the exposure for that group; expressed as claims per one hundred insured vehicle years.

Collision Coverages – As defined in insurance contracts, the coverage under which people insure their own car against loss caused by collision.

Exposure – The time interval an individual vehicle is insured. Exposure for a group of vehicles is expressed in units of insured vehicle years.

First-Party Coverage – An insurance coverage under which the policyholder collects compensation for his losses from his own insurer regardless of fault.

Injury Claim Frequency – The number of claims for a group of vehicles, divided by the exposure for that group; expressed as claims per one thousand insured vehicle years.

Loss Payment – That portion of the collision damage cost borne by the insurer; in general, the total collision damage cost minus the deductible amount.

No-Fault Auto Insurance – An auto insurance plan in which each driver/owner accepts financial responsibility for some or all losses sustained by himself, pedestrains hit by him, and occupants of his own vehicle in return for which he enjoys some immunity from liability for losses to third-party persons.

Personal Injury Protection (PIP) Coverage – First-party no-fault coverage in which an insurer pays, within the specified limits, the medical, hospital, and other expenses of the insured, others in his vehicle, and pedestrians struck by him.

Rated Driver – The driver who, for insurance purposes, is considered to represent the greatest loss potential for the insured automobile.

Vehicle Identification Number (VIN) – A code, variously comprising both numbers and letters; normally 8 to 15 characters in length, assigned to each automobile by its manufacturer. The VIN uniquely identifies the vehicle within at least a ten-year time span, and, in recent model year vehicles, almost always contains coding which identifies the make, series, model year and other characteristics of each vehicle.

Vehicle Series – A name denoting a family of vehicles, within a make, with the same wheelbase and a degree of commonality in construction such as body, chassis, etc.

List of Publications

Other research reports published by the Highway Loss Data Institute are:

R72-1 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1972 Models,* June 1973.

R73-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1973 Models Compared with 1972 Models,* September 1973.

R73-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models,* March 1974.

R73-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Two Years,* December 1974.

R73-4 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Three Years,* December 1975.

R74-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1974 Models,* May 1974.

R74-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Year,* December 1974.

R74-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Two Years,* December 1975.

R75-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1975 Models,* July 1975.

R75-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1975 Models During Their First Year,* December 1975.

R76-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1976 Models,* June 1976.

R76-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1976 Models During Their First Year, 1975 Models During Their First Two Years, 1974 Models During Their First Three Years,* December 1976.

R77-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1977 Models,* June 1977.

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Automobile Insurance Losses
Personal Injury Protection and Collision Coverages

RELATIONSHIPS BETWEEN INJURY AND COLLISION LOSSES AND ENGINE OPTIONS FOR SELECTED 1977-1979 COMPACT CARS

Research Report HLDI A-15
June 1981

Highway Loss Data Institute
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Washington, D.C. 20037

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Summary

This Highway Loss Data Institute report summarizes the injury and collision* coverage loss experience of a group of selected 1977 through 1979 compact cars in relation to their engine sizes.

Principal Findings

- For the specialty models there were pronounced relationships between their *collision* coverage loss experience and the size of their engines. The cars with the most powerful engines had the worst loss experience.

- For the specialty models there were no consistent relationships between their *injury* loss experience and the size of their engines.

- For the regular two- and four-door models there were no consistent relationships between their loss experience – either injury or collision – and the size of their engines.

- There were consistent differences between the loss experience – both injury and collision – for corresponding two- and four-door models. In virtually every case the results for the two-door models were worse than the results for the corresponding four-door models with the same engine.

*In this report, the term *collision* refers to the particular type of insurance sold as "Collision"coverage.

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Introduction

The Highway Loss Data Institute (HLDI) is a non-profit public service organization, that gathers, analyzes, and publishes insurance data concerned with the human and economic losses associated with motor vehicle use, and especially with the ways such losses vary among different kinds of vehicles.

In 1976 HLDI published a report on the relationships between insurance losses and engine specifications that was based on the collision coverage experience of 1973 models. It concluded that, in general, within a particular vehicle series the cars with the most powerful engine options had the worst collision coverage loss experience. Since that time, however, automobile manufacturers have de-emphasized engine power and focused instead on fuel economy in their marketing of passenger cars. This report analyzes the loss experience of a group of large-selling recent model year compact passenger cars in relation to their engine options to determine whether or not they exhibit relationships between engine size and loss experience.

The particular cars studied were the 1977-1979 models of the two- and four-door Chevrolet Malibu, two-door Oldsmobile Cutlass, two- and four-door Ford Granada, two- and four-door Ford Fairmont, two- and four-door Plymouth Volare, Chevrolet Monte Carlo, Chevrolet Camaro, and Pontiac Firebird. These particular cars were chosen for a number of reasons: they were all relatively large-selling automobiles and as such generated large amounts of exposure; they included cars from the three major domestic manufacturers; and they comprised a mixture of regular two-door, regular four-door, and specialty models. The study was limited to compact models because they are the smallest cars for which a number of engine options are generally available, and in addition they represent a growing segment of the passenger car market as more and more cars are down-sized. Other larger cars, such as intermediates, which also have a number of engine options available are rapidly disappearing from the new car market place and, consequently, their experience is not included in this report.

The results in this study were based on personal injury protection and collision coverage and loss data supplied by 10 insurers: Aetna, Allstate, GEICO, Kemper, Liberty Mutual, Nationwide, Prudential, State Farm, Travelers, and USAA.

A description of the sources and nature of the data used in this report is presented in Appendix A. The data analysis methods used are detailed in Appendix B, and definitions are provided in Appendix C.

It is intended that the dissemination of this and other HLDI reports will lead to research into ways of reducing vehicle-related damage to people and property, and also provide the public with information relating to the differences in the crash damage produced by different kinds of vehicles.

Results And Discussion

This report is based on the injury and collision coverage loss experience of twelve popular compact cars – five regular two-door models, four regular four-door models, and three specialty models. It summarizes the loss experience associated with each of the popular engine options sold with these cars.

Injury results are presented for 1977-1979 models and collision coverage results for 1978 and 1979 models.

Injury Results – Specialty Models

Specialty models, much more so than regular two-door and four-door models, have available a wide range of engine options, including particularly large and powerful engines. For example, cars such as the Pontiac Firebird can still be obtained with a 400 cubic inch V-8 engine with over 200 horsepower. When these cars are equipped with such powerful engines, the resulting power to weight ratios are very high and top speed capabilities are substantially higher than 100 mph. Engines as large as the 400 cubic inch V-8, available in a car like the Pontiac Firebird, are considerably larger than the largest engines available among regular two-door and four-door domestic compacts, which for cars like the Chevrolet Malibu and Oldsmobile Cutlass have displacements of about 300 cubic inches.

Table 1 shows the injury loss experience for the three specialty models for each of the popular engine options*. The results are presented as overall injury claim frequencies, claim frequencies for injuries with medical costs greater than $250, frequencies for injury costs greater than $500, and frequencies for injury costs greater than $1,000. The following exposure thresholds were used for reporting results – for the overall claim frequency results, a minimum of 5,000 insured vehicle years was required before any individual result was published; for the greater than $250 results, 10,000 years of exposure; for the greater than $500 results, 15,000 years of exposure; and for the greater than $1,000 results, 25,000 insured vehicle years of exposure.

As can be seen from Table 1, the actual frequencies of injury claims exceeding $250 was approximately one-third of the overall frequency, the frequency of claims exceeding $500 was about one-fourth of the overall frequency, and the frequency of claims exceeding $1,000 was about one-sixth of the overall frequency. It should be noted, however, that the total dollars paid out were dramatically influenced by the most expensive injury claims. Claims exceeding $500, while representing only one-fourth of all the claims, account for over 85 percent of the total dollars paid out. Similarly, claims exceeding $1,000, although representing only one-sixth of all claims accounted for approximately 75 percent of the total dollars paid out.

It is apparent from Table 1 that there were no pronounced relationships between the injury claim frequency results and the various engine options for these specialty models. Among the cars whose loss experience was examined, there was no tendency for the larger and more powerful engines to be associated with more frequent or more severe injury claims.

*The injury results shown in Tables 1 & 2 were standardized to remove effects due to differences in the mix of operator age group among different cars and engine options. Subsequent collision coverage results were similarly standardized to remove effects due to differences in both operator age group and deductible amount. The standardization procedure is described in detail in Appendix B.

Injury Results – Regular Two- and Four-Door Models

Table 2 shows the claim frequency results for the nine compact regular two- and four-door models. As with the results for the specialty models, there was again no evidence that the various engine options were associated with either higher or lower injury claim frequencies.

Four-door models, however, in most instances, had lower injury claim frequencies than the corresponding two-door models. For example, the Ford Granada two-door model sold with 250 cubic inch L-6 engine had higher injury claim frequency results in every claim size category than the equivalent four-door model with the same engine.

Collision Coverage Results – Specialty Models

Tables 3 and 4 show the collision coverage results for the 1978 and 1979 specialty models. Unlike the injury coverage results, for these cars there were very pronounced relationships between the collision coverage results and the size of the engines. For example, the Chevrolet Camaro with the 250 cubic inch L-6 engine, the smallest and least powerful engine for that car, had an average loss payment per insured vehicle year of $109 for the 1978 models and $110 for the 1979 models. These results were substantially lower than the results from the same car with the 350 cubic inch V-8 engine, the most powerful engine for that car. Models with the latter engine had an average loss payment per insured vehicle year of $150 for the 1978 models and $169 for the 1979 models, $41 and $59 higher than the corresponding results for the cars with the smallest engine.

In the case of the Pontiac Firebird, the range of results between cars equipped with the smallest and largest engines was even larger. The car with the smallest engine – a 231 cubic inch V-6 – had average loss payments per insured vehicle year of $100 and $116 for the 1978 and 1979 models respectively, compared with corresponding results of $190 and $194 for the cars with the 400/403 cubic inch V-8 engines. The greater loss experience among these specialty models associated with the larger and more powerful engines was found in both the claim frequency and average loss payment amount results. In general, in both model years the cars with the smallest engines had the lowest collision claim frequencies and average loss payments.

Collision Coverage Results – Regular Two- and Four-door Models

Tables 5 and 6 show the collision coverage results for the regular two- and four-door compact models studied. Unlike the specialty models, this group of cars exhibited no consistent relationships between engine size and collision coverage loss experience. There were, however, consistent differences between the corresponding two- and four-door models. In virtually every case the collision results for the two-door models were worse than the results for the corresponding four-door models with the same engine.

TABLE 1

PERSONAL INJURY PROTECTION COVERAGES
CLAIM FREQUENCY RESULTS BY ENGINE OPTION
SELECTED 1977-1979 COMPACT SPECIALTY MODELS

Make and Series	Engine Option		Exposure (Insured Vehicle Years)	Claim Frequencies by Size of Claim (per 1,000 Insured Vehicle Years)			
	No. of Cylinders	Displacement		All	>$250	>$500	>$1,000
Chevrolet Monte Carlo	6	200 cu. in.	5,438	25.8			
	6	231 cu. in.	23,788	20.3	7.2	5.4	
	8	267 cu. in.	21,763	19.3	8.1	5.4	
	8	305 cu. in.	80,355	20.0	8.1	5.5	3.4
Chevrolet Camaro	6	250 cu. in.	24,587	18.9	7.6	5.4	
	8	305 cu. in.	94,388	19.5	7.8	5.2	3.1
	8	350 cu. in.	44,713	20.4	6.9	4.8	2.7
Pontiac Firebird	6	231 cu. in.	10,397	19.7	6.3		
	8	301/305 cu. in.	36,495	20.1	8.0	5.7	3.5
	8	350 cu. in.	12,090	18.2	7.5		
	8	400/403 cu. in.	51,969	19.0	7.5	5.0	3.3

NOTES:

- Minimum exposure requirements for reporting:

All Claims	5,000 vehicle years
Claims >$250	10,000 vehicle years
Claims >$500	15,000 vehicle years
Claims >$1,000	25,000 vehicle years

- All results are standardized (see Appendix B).

TABLE 2

PERSONAL INJURY PROTECTION COVERAGES
CLAIM FREQUENCY RESULTS BY ENGINE OPTION
SELECTED 1977-1979 COMPACT TWO- AND FOUR-DOOR MODELS

Make and Series	Engine Option		Exposure (Insured Vehicle Years)	Claim Frequencies by Size of Claim (per 1,000 Insured Vehice Years)			
	No. of Cylinders	Displacement		All	>$250	>$500	>$1,000
Ford Granada (2-door)	6	250 cu. in.	56,327	18.9	7.7	5.1	2.9
	8	302 cu. in.	46,640	18.1	6.9	4.7	3.1
Ford Granada (4-door)	6	250 cu. in.	55,849	17.4	6.5	4.2	2.5
	8	302 cu. in.	48,497	15.8	6.3	4.2	2.7
Ford Fairmont (2-door)	4	2.3 litre	14,779	18.7	7.0		
	6	200 cu. in.	47,372	21.6	8.4	5.6	3.4
	8	302 cu. in.	9,848	22.5			
Ford Fairmont (4-door)	4	2.3 litre	8,386	19.3			
	6	200 cu. in.	30,982	18.0	7.2	4.5	3.0
Chevrolet Malibu (2-door)	6	200 cu. in.	22,590	17.9	5.8	3.9	
	8	267 cu. in.	8,601	16.1			
	8	305 cu. in.	20,402	17.4	6.0	3.6	
Chevrolet Malibu (4-door)	6	200 cu. in.	23,737	16.3	5.7	3.5	
	8	267 cu. in.	9,153	13.4			
	8	305 cu. in.	18,269	16.2	6.0	4.2	
Oldsmobile Cutlass (2-door)	6	231 cu. in.	32,190	17.8	6.6	4.1	2.5
	8	2[illegible] in.	124,067	16.6	6.7	4.5	2.6
	8	305 cu. in.	29,037	15.2	5.8	3.9	2.5
Plymouth Volare (2-door)	6	225 cu. in.	43,021	18.1	6.0	4.2	2.3
	8	318 cu. in.	10,032	16.7	6.0		
Plymouth Volare (4-door)	6	225 cu. in.	51,469	15.9	5.7	3.6	2.2
	8	318 cu. in.	11,526	14.7	5.4		

NOTES:

- Minimum exposure requirements for reporting: All Claims 5,000 vehicle years; Claims > $250 10,000 vehicle years; Claims > $500 15,000 vehicle years; Claims > $1,000 25,000 vehicle years
- All results are standardized (see Appendix B).

TABLE 3

COLLISION COVERAGES
LOSS PAYMENT RESULTS BY ENGINE OPTION
SELECTED 1978 COMPACT SPECIALTY MODELS

Make and Series	Engine Option		Exposure (Insured Vehicle Years)	Claim Frequency per 100 Insured Vehicle Years	Average Loss Payment per Claim	Average Loss Payment per Insured Vehicle Year
	No. of Cylinders	Displacement				
Chevrolet Monte Carlo	6	200 cu. in.	3,945	10.6	$ 983	$104
	6	231 cu. in.	38,543	10.5	999	105
	8	305 cu. in.	169,148	10.8	1040	112
Chevrolet Camaro	6	250 cu. in.	24,884	13.0	840	109
	8	305 cu. in.	84,766	12.5	898	112
	8	350 cu. in.	49,878	13.4	1123	150
Pontiac Firebird	6	231 cu. in.	8,407	11.8	850	100
	8	301/305 cu. in.	30,456	12.6	1006	127
	8	350 cu. in.	11,635	13.0	1033	134
	8	400/403 cu. in.	51,883	15.0	1268	190

NOTES:

- Results are standardized (see Appendix B).

TABLE 4

COLLISION COVERAGES
LOSS PAYMENT RESULTS BY ENGINE OPTION
SELECTED 1979 COMPACT SPECIALTY MODELS

Make and Series	Engine Option: No. of Cylinders	Engine Option: Displacement	Exposure (Insured Vehicle Years)	Claim Frequency per 100 Insured Vehicle Years	Average Loss Payment per Claim	Average Loss Payment per Insured Vehicle Year
Chevrolet Monte Carlo	6	200 cu. in.	8,609	10.8	$1043	$113
	6	231 cu. in.	18,546	9.5	1013	96
	8	267 cu. in.	50,467	10.0	1064	106
	8	305 cu. in.	42,202	10.1	1129	114
Chevrolet Camaro	6	250 cu. in.	9,990	12.7	867	110
	8	305 cu. in.	49,619	12.3	959	118
	8	350 cu. in.	45,534	13.8	1226	169
Pontiac Firebird	6	231 cu. in.	5,326	12.0	966	116
	8	301/305 cu. in.	30,430	12.4	1140	141
	8	400/403 cu. in.	42,909	13.6	1427	194

NOTES:

- Results are standardized (see Appendix B).

TABLE 5

COLLISION COVERAGES
LOSS PAYMENT RESULTS BY ENGINE OPTION
SELECTED 1978 COMPACT TWO- AND FOUR-DOOR MODELS

Make and Series	Engine Option		Exposure (Insured Vehicle Years)	Claim Frequency per 100 Insured Vehicle Years	Average Loss Payment per Claim	Average Loss Payment per Insured Vehicle Year
	No. of Cylinders	Displacement				
Ford Granada (2-door)	6	250 cu. in.	48,692	9.5	$ 952	$ 90
	8	302 cu. in.	22,414	8.8	948	83
Ford Granada (4-door)	6	250 cu. in.	48,974	8.5	973	83
	8	302 cu. in.	27,502	8.1	956	77
Ford Fairmont (2-door)	4	2.3 litre	17,647	8.6	940	81
	6	200 cu. in.	83,562	9.0	1021	92
	8	302 cu. in.	25,380	9.5	1085	103
Ford Fairmont (4-door)	4	2.3 litre	9.035	8.5	930	79
	6	200 cu. in.	54,313	8.2	982	81
Chevrolet Malibu (2-door)	6	200 cu. in.	30,812	8.6	914	79
	8	305 cu. in.	45,648	8.7	952	83
Chevrolet Malibu (4-door)	6	200 cu. in.	34,222	8.5	878	75
	8	305 cu. in.	41,038	8.0	922	74
Oldsmobile Cutlass (2-door)	6	231 cu. in.	36,191	9.3	944	88
	8	260 cu. in.	214,276	9.9	983	97
	8	305 cu. in.	45,593	10.0	1062	106
Plymouth Volare (2-door)	6	225 cu. in.	29,378	8.1	897	73
	8	318 cu. in.	6,417	8.8	1059	93
Plymouth Volare (4-door)	6	225 cu. in.	33,213	7.3	879	64
	8	318 cu. in.	6,291	6.7	814	55

NOTES:

- Results are standardized (see Appendix B).

TABLE 6

COLLISION COVERAGES
LOSS PAYMENT RESULTS BY ENGINE OPTION
SELECTED 1979 COMPACT TWO- AND FOUR-DOOR MODELS

Make and Series	Engine Option		Exposure (Insured Vehicle Years)	Claim Frequency per 100 Insured Vehicle Years	Average Loss Payment per Claim	Average Loss Payment per Insured Vehicle Year
	No. of Cylinders	Displacement				
Ford Granada (2-door)	6	250 cu. in.	25,312	8.6	$1037	$ 89
	8	302 cu. in.	4,461	8.7	1024	89
Ford Granada (4-door)	6	250 cu. in.	27,263	8.0	1009	81
	8	302 cu. in.	5,525	8.1	1083	88
Ford Fairmont (2-door)	4	2.3 litre	21,368	9.2	1022	94
	6	200 cu. in.	38,345	8.9	1068	95
	8	302 cu. in.	4,911	8.9	1185	105
Ford Fairmont (4-door)	4	2.3 litre	11,667	8.4	1043	88
	6	200 cu. in.	24,375	7.9	979	77
Chevrolet Malibu (2-door)	6	200 cu. in.	19,739	8.4	978	82
	8	267 cu. in.	20,414	8.2	1103	90
	8	305 cu. in.	10,502	8.5	1102	94
Chevrolet Malibu (4-door)	6	200 cu. in.	18,593	7.7	892	69
	8	267 cu. in.	20,036	7.9	918	73
	8	305 cu. in.	8,149	7.4	990	73
Oldsmobile Cutlass (2-door)	6	231 cu. in.	45,446	9.3	978	91
	8	260 cu. in.	125,656	9.4	1012	95
	8	305 cu. in.	36,655	9.4	1077	101
Plymouth Volare (2-door)	6	225 cu. in.	16,136	9.1	900	82
	8	318 cu. in.	1,951	9.6	1029	99
Plymouth Volare (4-door)	6	225 cu. in.	18,135	7.4	980	73
	8	318 cu. in.	1,773	7.1	894	63

NOTES:

- Results are standardized (see Appendix B).

Appendix A

Sources and Nature of Data

Sources and Nature of Data

This report is based on both policy and claim related coverage data for 1977 model year vehicles in the calendar period September 1976 through November 1980, for 1978 model year vehicles in the period September 1977 through November 1980, and 1979 model year vehicles in the calendar period September 1978 through November 1980. "Assigned risk", fleet policies, and all data from Massachusetts were excluded. The data used were supplied by ten insurers: Aetna, Allstate, GEICO, Kemper, Liberty Mutual, Nationwide, Prudential, State Farm, Travelers, and USAA.

The personal injury protection coverages reported in this study were based on data from the 20 states listed in Table A-1.

Table A-1
Personal Injury Protection (PIP) Coverages
States Included

Colorado	Minnesota
Connecticut	Nevada (through December 1979)
Delaware	New Jersey
Florida	New York
Georgia	North Dakota
Hawaii	Oregon
Kansas	Pennsylvania
Kentucky	South Carolina
Maryland	Texas
Michigan	Utah

Insurance Policy Data

Insurance policy data, as distinct from claim data, describe the characteristics of an insured vehicle, including its make and series and the nature of its collision coverage. Policy data used in this report included the following basic information:

- Vehicle Identification Number (VIN)*
- Deductible Amount*
- Rated Driver Characteristics*
- Date and Nature of Relevant Changes in Coverage

Insurance Claim Data

Insurance claim data report the characteristics of an insured vehicle for which a collision coverage claim is made, the initiation of the claim, and/or the corresponding payment. Claim data used in this report included the following basic information:

- Vehicle Identification Number (VIN)
- Crash Date
- Loss Payment Amount

The dollar amounts reported for collision coverage losses represented loss payments made to or on behalf of the policyholder for damage to the insured vehicle.

*See Appendix C for definitions.

Appendix B

Method of Data Analysis

Method of Data Analysis

Insurance Coverages

Results in this report are based on "personal injury protection" (PIP) and collision coverages. PIP coverages are provided in so-called no-fault states. These coverages were selected because they provide medical expense reimbursement to injured occupants of the insured vehicle.

Use of PIP insurance data to identify crashes involving injury has certain limitations because these data cannot provide information on all occupant injuries. This occurs when claims for injury costs are not made under PIP coverages because of the availability of other sources of medical expense reimbursements such as bodily injury liability and/or health insurance coverages. Consequently, PIP claim frequencies do not include all of the crashes involving injury. This limitation should not distort comparisons among different vehicles.

Vehicle Description and Identification

The Vehicle Identification Numbers (VINs) of most new automobiles sold in the United States are individually unique numbers that contain, in coded form, detailed information as to each vehicle's make, model year, series*, and other distinguishing characteristics.

The very specific vehicle types for which results are presented in this report were derived from the VINs of the individual automobiles.

Only data with valid VINs were used for this report. Each VIN was decoded into a set of specific characteristics. For the purposes of this report the vehicle characteristics of primary concern were make, model year, series, body style, engine type, and displacement.

Exposure

Exposure, in insured vehicle years, was computed for each individual vehicle from the coverage data. The total number of insured vehicle years for each vehicle series with each available engine was obtained by accumulating the exposure for all of the individual vehicles of that vehicle series.

Exposure was obtained for the vehicles series with each available engine within the series, for each of the four most common combinations of deductible amount and operator age group, a, b, c, d, shown below:

Deductible Amount	Youthful Operator*	No Youthful Operator*
<$150	a	b
≥$150	c	d

For PIP injury coverages, exposure was computed only for each operator age group – youthful operators and no youthful operators.

*See Appendix C for definitions.

Claim Frequency

Both pending and paid claims for an individual vehicle were first matched with its corresponding coverage data to ensure that the crash had occurred within an appropriate period of injury or collision coverage for that vehicle. In every instance in which multiple claims were made for the same crash – e.g., when more than one occupant of the car incurred medical expenses – the claims were treated as a single injury claim in the calculation of claim frequencies. It should be noted that medical expenses can sometimes be incurred even though the occupants are not injured. This can occur, for example, when precautionary medical examinations are undertaken even though no injuries are apparent, or, in fact, found.

Claims that were settled without payment, as well as those paid for collision losses even though the damage was less than the deductible amount, were excluded for the computations. All remaining claims for each vehicle series, together with the corresponding exposure, were used to compute the claim frequency. Claim frequencies were separately calculated for the vehicles with each available engine option within each series. For injury coverages the claim frequency is the number of claims per 1,000 insured vehicle years; for collision coverages, it is the number of claims per 100 insured vehicle years.

In addition to the overall claim frequency results, separate claim frequency results were computed for claims in which the medical losses exceeded $250, $500, and $1,000. The latter three results provide indications of the extent to which particular cars are over- or under-involved in crashes resulting in more significant injuries. Claims involving non-medical losses only and claims settled without payments were not used. Thus, the claim frequencies represent the number of crashes per 1,000 insured vehicle years in which one or more injuries occurred resulting in medical expense claim payments under PIP insurance coverages.

Average Loss Payment

For collision coverages, average loss payments per claim were calculated for each vehicle series and available engine option. The paid claims were summed and divided by the number of claims to produce the average loss payment per claim. Claims that were settled without payment, as well as those paid even though the damage was less than the deductible amount, were excluded from the computations. In every instance in which multiple claims and/or multiple payments were made for the same crash, they were treated as a single claim and/or a single payment in the calculation of average loss payment.

Average loss payments were also obtained for each combination of the two principal deductible amounts and the two operator age groups.

Average Loss Payment Per Insured Vehicle Year

For collision coverages the average loss payment per insured vehicle year for each vehicle series and available engine option within the series was obtained by multiplying each respective claim frequency per 100 insured vehicle years by its corresponding average loss payment and dividing the result by 100.

Average loss payments per insured vehicle year were also obtained for each combination of deductible amount and operator age group.

Standardization

It is well known that loss experience can vary substantially in relation to certain non-vehicle factors. One important factor that influences loss experience is operator age. Youthful operators generally generate higher insurance losses than older drivers. Thus, if compared vehicles have different proportions of youthful operators, this difference, if not taken into consideration, would be sufficient to bias the comparison.

In order to remove any biases that could result because of variations among different vehicles in operator age group, the PIP injury coverage results for each vehicle series and available engine option were weighted, using the values shown below, to produce a weighted average of the actual results for each operator age group. In this way the results for each vehicle series are based on the same mix, or distribution, of exposure for the two operator age groups.

Since the same weights are used for each vehicle series, the effects due to operator age group are present in equal amounts in the standarized results for each individual series. Therefore, to the extent that the age distributions within operator age group do not vary substantially for different vehicles, these effects can no longer bias comparisons among vehicles.

For collision coverages, results obtained from the two deductible categories, less than $150 and greater than or equal to $150, also vary. For example, average loss payments for the higher deductibles are greater than those for the lower deductibles. Again, if compared vehicles have different proportions of lower deductible coverages, this difference, if not taken into consideration, would also be sufficient to bias the comparison.

Consequently, in order to remove any biases in the comparison of results that could arise because of differences attributable to variations among different vehicles in deductible amount and operator age group, collision loss results were first adjusted or standardized so as to equalize the effects of the two non-vehicle factors in the standardized results. In this procedure, applied to both claim frequency and average loss payments, a weighted average of the actual results for each combination of deductible amount and operator age group was computed using the standardization weights shown in the table. Since the same weights were always used, the effects due to the non-vehicle factors were present in equal amounts in the standardized results. Therefore, to the extent that the age distributions within each operator age group and the deductible distributions within each deductible group do not vary substantially for different vehicles, these effects can no longer bias comparisons of results.

The standardization procedure employed is widely used in vital health statistics*. The basic principle of the method is the introduction of a selected population with a standard distribution across the combinations of deductible amount and operator age group as represented by the standardization weights in the table.

Injury Standardization Weights

Youthful Operator	No Youthful Operator	Combined
0.15	0.85	1.0

Collision Standardization Weights

Deductible Amount	——Operator Age Group——		
	Youthful Operator	No Youthful Operator	Combined
<$150	0.10	0.60	0.70
≥$150	0.05	0.25	0.30
Combined	0.15	0.85	1.00

*For example, see Armitage, P. (1971), *Statistical Methods in Medical Research*, Wiley, New York.

Appendix C

Definitions

Definitions

Average Loss Payment per Claim – The total of all collision loss payments made for the claims for a group of vehicles, divided by the number of claims paid; expressed as dollars per claim.

Average Loss Payment per Insured Vehicle Year – For a group of vehicles, the product of Claim Frequency and Average Loss Payment per Claim, divided by 100; expressed as dollars per insured vehicle year. It should be noted that this definition differs from the commonly used insurance term, pure premium, but yields similar results.

Claim Frequency – The number of claims for a group of vehicles, divided by the exposure for that group; expressed as claims per one hundred insured vehicle years for collision coverages, and as claims per one thousand insured vehicle years for PIP coverages.

Collision Coverages – As defined in insurance contracts, the coverage under which people insure their own car against loss caused by collision.

Deductible Amount – That portion of the collision damage cost borne by the policyholder. For computing results, deductible amounts are split into two groups: less than $150 (mainly $50 and $100 deductibles) and greater than or equal to $150 (mainly $200 and $250 deductibles).

Exposure – The time interval an individual vehicle is insured. Exposure for a group of vehicles is expressed in units of insured vehicle years.

First-Party Coverage – An insurance coverage under which the policyholder collects compensation for his losses from his own insurer regardless of fault.

Loss Payment – That portion of the collision damage cost borne by the insurer; in general, the total collision damage cost minus the deductible amount.

No-Fault Auto Insurance – An auto insurance plan in which each driver/owner accepts financial responsibility for some or all losses sustained by himself, pedestrians hit by him, and occupants of his own vehicle in return for which he enjoys some immunity from liability for losses to third-party persons.

Operator Age Group – The factor which distinguishes those vehicles whose rated driver is youthful from those vehicles whose rated driver is not youthful (see Youthful Operator).

Personal Injury Protection (PIP) Coverage – First-party no-fault coverage in which an insurer pays, within the specified limits, the medical, hospital, and other expenses of the insured, others in his vehicle, and pedestrians struck by him.

Rated Driver – The driver who, for insurance purposes, is considered to represent the greatest loss potential for the insured automobile.

Vehicle Identification Number (VIN) – A code, variously comprising both numbers and letters; normally 8 to 15 characters in length, assigned to each automobile by its manufacturer. The VIN uniquely identifies the vehicle within at least a ten-year time span, and, in recent model year vehicles, almost always contains coding which identifies the make, series, model year, and other characteristics of each vehicle.

Vehicle Series – A name denoting a family of vehicles, within a make, with the same wheelbase and a degree of commonality in construction such as body, chassis, etc.

Vehicle Size Group – A grouping of vehicles based on wheelbase. There are six car size classes defined as follows:

> ***Small Subcompact*** – Vehicles with wheelbases less than or equal to 96 inches.
>
> ***Subcompact*** – Vehicles with wheelbases greater than 96 inches and less than or equal to 101 inches.
>
> ***Small Compact*** – Vehicles with wheelbases greater than 101 inches and less than or equal to 106 inches.
>
> ***Compact*** – Vehicles with wheelbases greater than 106 inches and less than or equal to 111 inches.
>
> ***Intermediate*** – Vehicles with wheelbases greater than 111 inches and less than or equal to 120 inches.
>
> ***Full-Size*** – Vehicles with wheelbases greater than 120 inches.

Each vehicle size group is further divided into four subgroups – regular two-door models, regular four-door models, station wagons, and sports or specialty models. In the compact, intermediate, and full-size groups, the specialty models are those that either have only two-door models or are luxury cars. The sports subgroup in the two subcompact size classes are sports models which are basically two-seater cars.

Youthful Operator – For the purposes of this report, all males (married or single) under 25 years of age and all unmarried females under 25 years of age.

List of Publications

Other research reports published by the Highway Loss Data Institute are:

R72-1 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1972 Models,* June 1973.

R73-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1973 Models Compared with 1972 Models,* September 1973.

R73-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models,* March 1974.

R73-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Two Years,* December 1974.

R73-4 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1973 Models During Their First Three Years,* December 1975.

R74-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1974 Models,* May 1974.

R74-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Year,* December 1974.

R74-3 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1974 Models During Their First Two Years,* December 1975.

R75-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1975 Models,* July 1975.

R75-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1975 Models During Their First Year,* December 1975.

R76-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1976 Models,* June 1976.

R76-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1976 Models During Their First Year, 1975 Models During Their First Two Years, 1974 Models During Their First Three Years,* December 1976.

R77-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1977 Models,* June 1977.

R77-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1977 Models During Their First Year, 1976 Models During Their First Two Years, 1975 Models During Their First Three Years,* December 1977.

R78-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1978 Models,* June 1978.

R78-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1978 Models During Their First Year, 1977 Models During Their First Two Years, 1976 Models During Their First Three Years,* January 1979.

R79-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1979 Models,* June 1979.

R79-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1979 Models During Their First Year, 1978 Models During Their First Two Years, 1977 Models During Their First Three Years*, December 1979.

R80-1 *Automobile Insurance Losses, Collision Coverages; Initial Results for 1980 Models*, June 1980.

R80-2 *Automobile Insurance Losses, Collision Coverages; Variations by Make and Series, 1980 Models During Their First Year, 1979 Models During Their First Two Years, 1978 Models During Their First Three Years*, December 1980.

V78-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups and Utility Vehicles, 1978 Models During Their First Year, 1977 Models During Their First Two Years*, February 1979.

V79-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups and Utility Vehicles, 1979 Models During Their First Year, 1978 Models During Their First Two Years*, April 1980.

V79-2 *Automobile Insurance Losses, Personal Injury Protection Coverages; Claim Frequency Results by Size of Claim for 1977, 1978, and 1979 Vans, Pickup Trucks, and Utility Vehicles*, October 1980.

V79-3 *Insurance Theft Losses; Vans, Pickups, and Utility Vehicles, 1979 Models.* May 1981.*

V80-1 *Automobile Insurance Losses, Non-Commercial Collision Coverages; Variations by Make and Series, Vans, Pickups, and Utility Vehicles, 1980 Models During Their First Year, 1979 Models During Their First Two Years, 1978 Models During Their First Three Years*, December 1980.

I 75-1 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1974 and 1975 Models*, June 1976.

I 75-2 *Automobile Insurance Losses, Percentage of Collision Claims with Associated Injury Claims for 1974 and 1975 Models*, March 1977.

I 76-1 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1974, 1975, and 1976 Models*, November 1977.

I 76-2 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1974, 1975, and 1976 Models*, September 1978.

I 77-1 *Automobile Insurance Losses, Injury Coverages; Claim Frequency Results for 1977 Models*, September 1978.

I 78-1 *Automobile Insurance Losses, Personal Injury Protection Coverages; Claim Frequency Results for 1977 and 1978 Models*, September 1979.

I 79-1 *Automobile Insurance Losses, Personal Injury Protection Coverages; Claim Frequency Results by Size of Claim for 1977, 1978, and 1979 Models*, October 1980.

A-1 *Automobile Insurance Losses, Collision Coverages; A Comparison of Results for 1972 and 1973 Models*, May 1974.

A-2 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Density, 1972 and 1973 Models*, September 1974.

A-3 *Automobile Insurance Losses, Collision Coverages; A Comparison of Results for 1973, 1974 and 1975 Models*, July 1975.

A-4 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Density, 1974 and 1975 Models*, December 1975.

A-5 *Automobile Insurance Losses, Collision Coverages; Relationships Between Losses and Vehicle Body Style, 1974 and 1975 Models*, December 1975.

A-6 *Automobile Insurance Losses, Collision Coverages; An Investigation of Relationships Between Losses and Engine Specifications, Using 1973 Models*, June 1976.

A-7 *Automobile Insurance Losses, Collision Coverages; Annual Increases and Seasonal Variations, 1972, 1973, 1974 and 1975 Models*, June 1976.

A-8 *Automobile Insurance Losses, Injury Coverages; A Preliminary Comparison of Results from Volkswagen Rabbits with Passive and Active Seat Belts, 1975 and 1976 Models*, June 1977.

A-9 *Automobile Insurance Losses, Collision Coverages; A Comparison of Collision Claim Size Distributions for 1974, 1975, and 1976 Models*, November 1977.

A-10 *Automobile Insurance Losses, Injury Coverages; Comparisons of Claim Frequencies of Volkswagen Rabbits with Automatic and Manual Seat Belts, 1975, 1976, and 1977 Models*, June 1979.

A-11 *Automobile Insurance Losses, Collision Coverages; The Consistency of the Loss Experience of Specific Vehicles Produced in Several Years, 1975 To 1978 Models*, June 1979.

A-12 *Automobile Insurance Losses, Collision Coverages; An Assessment of the Effects of the Federal Safety Bumper Standard on the Losses for 1972 Through 1978 Models*, June 1980.

A-13 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; The Effects of Car Size on Crash Losses, 1977-1980 Models*, May 1981.

A-14 *Automobile Insurance Losses, Personal Injury Protection and Collision Coverages; Comparisons of the Loss Experience of Two- and Four-Door Cars, 1978, 1979, and 1980 Models*, June 1981.

T79-1 *Automobile Insurance Theft Losses by Make and Series, 1979 Models*, June 1980.

T80-1 *Automobile Insurance Theft Losses by Make and Series; 1979 and 1980 Models.* April 1981.